

CIO

THE MAGAZINE FOR INFORMATION EXECUTIVES

MARCH 15, 1996

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CALL FOR ENTRIES

THE FIFTH ANNUAL CIO ENTERPRISE VALUE AWARDS

*Honoring Business Achievement
Through The Innovative Use
Of Information Technology*

DEADLINE: JULY 1, 1996



YOUR EFFORT

Innovation

Value

Collaboration

YOUR REWARD

Honor

Recognition

Prestige

The Enterprise Value AwardsSM

The Most Prestigious Award For Innovative IT Solutions

THE PRESSURE AMONG I.T. EXECUTIVES TO PROVE the value of IT has become a mandate of corporate life. Top management closely scrutinizes the bottom line to determine whether IT is providing a profitable return on investment. The trend has motivated many IT executives to develop methods for measuring both the hard and soft benefits derived from information technology.

That in turn prompted the editors of *CIO* Magazine to create the Enterprise Value Awards. By honoring the strategists who implement innovative, value-rich IT solutions, we at *CIO* hope to inspire others in their search for enterprise value.

DO YOU QUALIFY FOR AN ENTERPRISE VALUE AWARD?

Four criteria are essential.

1. A return of value to the enterprise
2. A measurable financial return attributable to the system.
3. The pervasiveness of information technology—in other words, the strategic objective could not have been met without IT's contribution
4. Collaboration between an IT executive and a business executive

WHAT EXACTLY DO WE MEAN BY VALUE?

Many think of value as return on investment. And while ROI will certainly be a key factor for determining Enterprise Value

Award recipients, value can also be obtained with systems that:

- enable new, innovative and more productive ways of doing business
- enable revamped organizational structures or styles of performing the work of the enterprise
- enable the enterprise to enter a new market
- enable global expansion
- transform the way the enterprise competes within its customary market or the terms of competition in the market
- improve the enterprise's relationships with its customers
- improve the enterprise's relationships with its own employees or functions
- help the enterprise compete more effectively by adding to the sum of its available knowledge assets
- enable leaner and more economical operations

If you fit the Enterprise Value Award profile, we urge you to fill out the Application Form bound in this issue. The Feb. 1, 1997, issue of *CIO* will feature profiles of the winning organizations and the executives who have proved that their strategic technology solutions and collaborative efforts have had a positive and sustained impact on the enterprise.

CIO will host a special awards ceremony honoring the Enterprise Value Award winners at the annual *CIO* Enterprise Value Retreat, Feb. 2–5, 1997.

CTO

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COVER STORY

CIOs and The Internet

Are You a Cyberuser Or a Cyberloser?

ALSO INSIDE

IT Consolidation: International Brewer Hops to It

AN INTERNATIONAL DATA GROUP PUBLICATION

Tyson Foods' Steve Hankins:
Cyberuser



- Intel 120-MHz Pentium
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processors. This future-ready family also supports upgrades to

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CIO

VOLUME 9, NUMBER 11

COVER STORY

CIOs IN CYBERSPACE

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Sky Pilots

IS executives have lots of reasons for delaying the takeoff into the Internet: productivity, security and scalability. But advance-guard CIOs who are already navigating cyberspace warn that the countdown has begun.

By E.B. Baatz

Prepare for takeoff

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*Cover photo by
Reid Horn*

FEATURES

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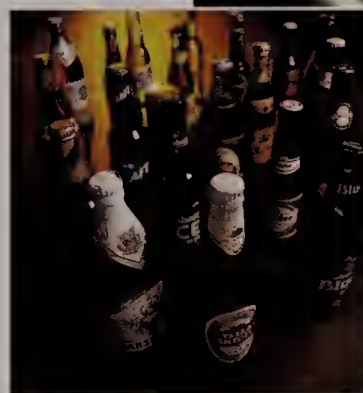
Tapping New Markets

A successful blend of IT consolidation and vision has helped Interbrew become a global competitor, and the fourth-largest brewer in the world.

By Richard Pastore

*In the market
for speed*

48



*More than a
home brew*

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I.S. AND MARKETING

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To Market, To Market

No matter what your company's marketing approach, the underlying concept is the same: It's got to be fast, flexible and inexpensive. To accomplish that, you're going to need IT.

By Rosemary Cafasso

MORE ►►►



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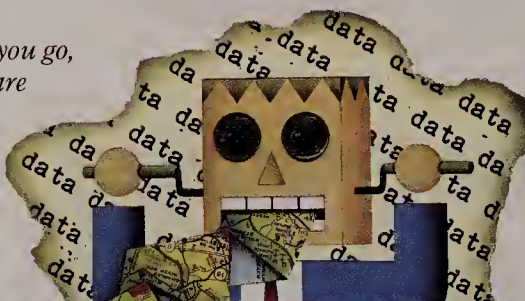
The Bright Stuff

According to this Harvard psychologist's theory of multiple intelligences, it takes more than a high IQ to be a smart manager and leader.

By Christopher Koch

Defining intelligence
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*Wherever you go,
there you are*
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STATE OF THE ART: A MAPPABLE FEAST

Geographic information systems, once the tool of governments, geologists and cartographers, have found a home in the business community. And managers will never look at maps the same way again.

By Dennis Hamilton

FRAME RELAY

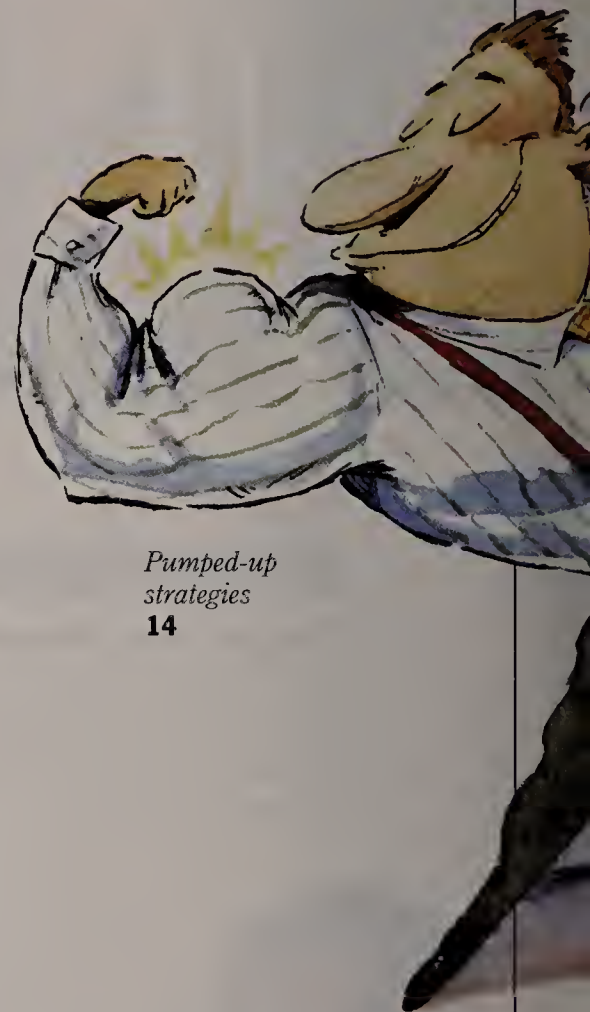
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WORKING SMART: GRAPES OF WRATH

The inefficiencies of fax-based inventory management were keeping the Kendall-Jackson winemakers from their grapes—until frame relay and a client/server system liberated them.

By Tam Harbert

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beasts at bay*
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*Pumped-up
strategies*
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- IS auditions
- Breaking up isn't hard to do
- Virus containment
- Flex those PCs
- A sweet seat
- Career moves

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FYI 68

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APPLICATION FORM

THE FIFTH ANNUAL CIO ENTERPRISE VALUE AWARDS

*Honoring Business Achievement
Through The Innovative Use
Of Information Technology*

APPLICATION DEADLINE: JULY 1, 1996

Sponsored by CIO Communications, Inc.

The Enterprise Value Awards SM

*Honoring Business Achievement Through
The Innovative Use Of Information Technology*

SPONSORED BY



CRITERIA

Winners will be chosen by a panel of independent judges from among entrants who have submitted completed application forms to *CIO* by July 1, 1996. Entries will be judged on the following criteria:

- The extent to which the system adds business value in furthering the organization's strategic objectives
- The measurable financial return the system provides to the organization
- The extent to which IT was key to achieving the overall business solution—the “couldn't have done it without technology” factor
- The quality of collaboration between the business unit and IS organization that is achieved throughout the course of the project

Each finalist will be subject to an in-depth analysis of the nominated system (to be performed by *CIO* or its agents). This analysis, which may require a site visit, will be based on interviews with sponsoring executives and system users and will be designed to substantiate all claimed benefits. Notification of winners will occur in October 1996. *CIO* reserves the right to publish relevant cost and savings figures that establish the claimed ROI of the system; *the willingness to divulge this information for publication is a condition of entry.*

DEFINING VALUE

We invite applicants to consider the broadest possible spectrum of enterprise value. The following list of IT-enabled benefits is intended to help guide applicants' thinking:

- new, innovative and more productive ways of doing business;
- revamped organizational structures or styles of performing the work of the enterprise;
- the ability of the enterprise to enter a new market;
- successful global operation or expansion;

- transformation of the way the enterprise competes within its customary market or of the terms of competition within the market;
- improvement of the enterprise's relationships with its external customers;
- improvement of the enterprise's relationships with its own employees or among its functions (such as marketing, finance or human resources);
- the ability of the enterprise to compete more effectively by adding to the sum of its available knowledge assets;
- leaner and more economical operations.

ENTRY GUIDELINES

- The system must have been operational prior to July 1, 1994.
- Entrants must agree to be featured, along with their systems and organizations, in a *CIO* article.
- Entries must be complete.
- Entries must be on 8.5-by-11-inch paper, one side per sheet.
- The application form may be reproduced.
- Multiple entries from one company will be considered, but each entry must be submitted separately.
- Entries must be made jointly by the IS executive *AND* the business sponsor for whom the system delivers value.
- IT vendors, public relations and advertising companies, consultants and other third parties may *NOT* apply on behalf of another company. They are encouraged to forward this form to the “owner” of the system, or to contact *CIO* Communications to recommend that an application form be sent to the client.
- All entries must be computer generated or typed; no handwritten entries will be accepted.
- When feasible, an additional copy of the entry should be sent on a 3½ -inch disk. Electronic entries must be limited to word-processing and spreadsheet packages that are compatible with Microsoft Word and Microsoft Excel on a Windows or Macintosh platform.

1. COMPANY/BUSINESS UNIT

▲ NAME OF PARENT COMPANY

CITY, STATE WHERE HEADQUARTERS ARE LOCATED

PUBLICLY OR PRIVATELY HELD?

ANNUAL REVENUES

INDUSTRY

NAME OF BUSINESS UNIT OR ORGANIZATION

CITY, STATE WHERE LOCATED

NUMBER OF EMPLOYEES AT BUSINESS UNIT

2. ENTRANTS

A.

▲ NAME OF ENTERING I.S. EXECUTIVE

TITLE

NAME OF DIVISION, DEPARTMENT OR UNIT

ADDRESS

CITY

STATEZIP

() ()

TELEPHONEFAX

B.

▲ NAME OF ENTERING BUSINESS-UNIT EXECUTIVE

TITLE

NAME OF DIVISION, DEPARTMENT OR UNIT

ADDRESS

CITY

STATEZIP

() ()

TELEPHONEFAX

3. SUPPORTERS

Please list four people who are willing to be interviewed with regard to the system, its development, its use and the value returned. At least one should be a member of the technology team that developed the system and should have played a significant role. At least one should be a primary user from the sponsoring business unit. The other two may be from either organization or represent suppliers, customers or others intimately familiar with the system.

A.

▲ NAME

TITLE

() ()

TELEPHONEFAX

REASON FOR INCLUSION

B.

▲ NAME

TITLE

() ()

TELEPHONEFAX

REASON FOR INCLUSION

C.

▲ NAME

TITLE

() ()

TELEPHONEFAX

REASON FOR INCLUSION

D.

▲ NAME

TITLE

() ()

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REASON FOR INCLUSION

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DEADLINE:

JULY 1, 1996

ENTERPRISE VALUE AWARDS
CIO COMMUNICATIONS, INC.
492 OLD CONNECTICUT PATH
P.O. Box 9208
FRAMINGHAM, MA 01701-9208

4. THE NOMINATED ORGANIZATION

Please tell us about your organization (company, business unit, agency) in 500 words or less. Include information on:

- when the organization was founded;
- mission statement;
- major products and services;
- markets served;
- any other data you believe to be relevant in terms of general background.

5. THE NOMINATED SYSTEM

Tell us about the nominated system and demonstrate its importance to the organization by completing the following sections. Please limit your material to two pages.

SYSTEM DESCRIPTION: In one sentence or less, describe the system or IT initiative you are nominating (e.g., order-entry or document-management system; switch to a client/server architecture).

TECHNICAL PROFILE: Briefly describe the technology of the nominated system. Please include the names of major vendors and products. (NOTE: The examples provided here are meant to be illustrative, not all-inclusive.)

- **ARCHITECTURE** (e.g., client/server, mainframe)
- **HARDWARE** (e.g., mainframe/parallel processor, mini-computer/server, PCs, handheld devices)
- **SOFTWARE** (e.g., operating systems, database system, shells, application software)
- **SOFTWARE DEVELOPMENT TOOLS** (e.g., CASE, 4GLs, GUI developers, object-oriented development tools)
- **NETWORK/COMMUNICATIONS HARDWARE, SOFTWARE AND SERVICES** (e.g., modems, routers, e-mail packages, carriers and public networks)

6. BUSINESS IMPACT

Describe the primary business objectives of and value delivered by the IT investment. Please limit this section to five pages.

SCOPE AND IMPACT: Identify the functions (e.g., customer service, manufacturing, planning) that were changed by the system, the nature of those changes and their impact on the business.

STATEMENT OF VALUE: In one or two sentences, describe the business value delivered by the nominated system (please refer to "Defining Value" section on the first page of the application form).

BUSINESS VALUE DESCRIPTION: In detail, describe *how* the system delivers the value identified above. Also describe any added value delivered, whether intentionally sought or serendipitously encountered.

THE IMPORTANCE OF IT: Identify the different components of the overall business change (e.g., business reengineering, downsizing, cycle times). Explain the importance of the IT component to the overall business change. Could the results have been achieved without IT?

COLLABORATION: Describe how the business unit and IS organization worked together throughout the project, from concept to implementation. What were the specific tasks fulfilled by the business unit? The IS organization?

7. QUANTIFYING ROI

Provide a detailed, one-page summary of the nominated system's investment costs (including all upfront development expenses and annual maintenance charges). Also provide estimates of returns (including increased profits,

reduced costs and indirect cost-avoidance). Estimates of costs and returns should be made per annum over a five-year period.

8. TRUTH OF INFORMATION/RELEASE

The following release must be signed by both nominating executives if the application is to be considered. *Unsigned releases will invalidate the entry.*

I **HEREBY STATE** that the information provided is true and complete to the best of my knowledge and belief.

I **AUTHORIZE** the release and use of, in connection with the Enterprise Value Awards program, any and all materials furnished by me or others at the company contacted for this judging. I understand that information submitted on this application or subsequently gathered during the evaluation and judging process may be used in articles or any other type of publicity relating to the Enterprise Value Awards program.

I **ALSO AUTHORIZE** the release and use of my name, my company's name and my likeness, including but not limited to any photographs and any recording of my voice or image that may be taken of me for *CIO Magazine*. I agree that no compensation shall be due me or my company for such usage.

I **RECOGNIZE** that failure to meet these conditions or to provide sufficient material that can be published can cause the application to be rejected at any point in the process at the sole discretion of the sponsors.

1. _____

▲ SIGNATURE OF NOMINATING I.S. EXECUTIVE

DATE

2. _____

▲ SIGNATURE OF NOMINATING BUSINESS EXECUTIVE

DATE

9. OTHER EDITORIAL OPPORTUNITIES

If you are not selected as an award recipient, are you willing to be contacted for inclusion in other articles in *CIO Magazine*? YES ☐ NO ☐

How did you learn about the Enterprise Value Awards program?

- | | |
|---|--|
| ☐ CIO MAGAZINE | ☐ ACADEMICIAN |
| ☐ CONSULTANT | ☐ IS STAFF MEMBER |
| ☐ SYSTEMS INTEGRATOR | ☐ OTHER PUBLICATIONS |
| ☐ PR AGENCY | ☐ VENDOR |
| ☐ ADVERTISING AGENCY | ☐ OTHER (PLEASE IDENTIFY) |

CHECKLIST

HAVE YOU FILLED OUT...?

- ☐ Company/Business-Unit, Entrants and Supporters Information

HAVE YOU INCLUDED ON SEPARATE PAGES...?

- ☐ Nominated Organization
- ☐ Nominated System
- ☐ Business Impact
- ☐ Return on Investment

HAVE BOTH ENTRANTS SIGNED AND DATED...?

- ☐ Truth of Information/Release

HAVE YOU CHECKED OFF...?

- ☐ Other Editorial Opportunities
- ☐ How you learned about the Enterprise Value Awards program?

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SCULPTURE BY DAVID SHAPIRO; PHOTO BY RALPH MERCER

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The value of IT. It's real. You know it, and you've proved it. Your organization is actually realizing business value and hard-dollar benefits from IT investments. And although the payback is its own reward, the CIO Enterprise Value Award will bring you, your company and your IT organization the industry recognition you all deserve!

POSITIONING IT AS A BUSINESS ASSET

Yet the CIO Enterprise Value Award goes beyond recognition. It is an opportunity to provide hard, tangible facts about ROI from information technology to the business community at large. It is an opportunity to demonstrate how partnering between business and technology executives can lead to the achievement of strategic objectives. By communicating the payback, *CIO* hopes to encourage other businesses to invest wisely in IT to ensure their survival in a fiercely competitive global market.

DO YOU QUALIFY FOR AN ENTERPRISE VALUE AWARD? FOUR CRITERIA ARE ESSENTIAL:

1. A return of value to the enterprise (see "Defining Value" within this application)
2. A measurable financial return attributable to the system
3. The pervasiveness of information technology—in other words, the strategic objective could not have been met without IT's contribution
4. Collaboration between an IT and business executive

If your innovative solution meets the above criteria, please fill out this Enterprise Value Awards application form. The Feb. 1, 1997, issue of *CIO* will feature profiles of the winning organizations and the executives who have proved that their strategic technology investments have had a positive and sustained impact on enterprise value.

In February 1997, *CIO* will host a special awards ceremony honoring the Enterprise Value Award winners at the annual CIO Enterprise Value Retreat.

For more information, please contact Lisa Kerber at (508) 935-4449.

ENTERPRISE VALUE AWARDS TIMELINE

APPLICATION DUE: July 1, 1996

JUDGES SELECT WINNERS: October 1996

WINNERS ANNOUNCED: October 1996

AWARDS CEREMONY: Feb. 2-5, 1997
at the CIO Enterprise Value Retreat

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Vice President, Information Systems

Jeffrey Otten
CEO

GENSYM CORP.

Troy A. Heindel
CIO & Vice President, Support Services

Lowell Hawkinson
Chairman & CEO

MCDONNELL DOUGLAS HELICOPTER SYSTEMS

Andrew Miller
Director, Information Technology

William R. Ringer
Business Development Representative

ROCKWELL INTERNATIONAL CORP. SPACE SYSTEMS DIVISION

Kodumudi S. Radhakrishnan
Division Director, Information Management

R. M. Glaysher
Vice President & General Manager

TELOGY INC.

Sateesh B. Lele
CIO & Senior Vice President

Anthony M. Schiavo
Chairman & CEO

UNITED HEALTHCARE CORP.

James P. Bradley
former CIO

Paul LeFort
CIO

Kathy Walstead-Plumb
Senior Vice President, Group Services Administration

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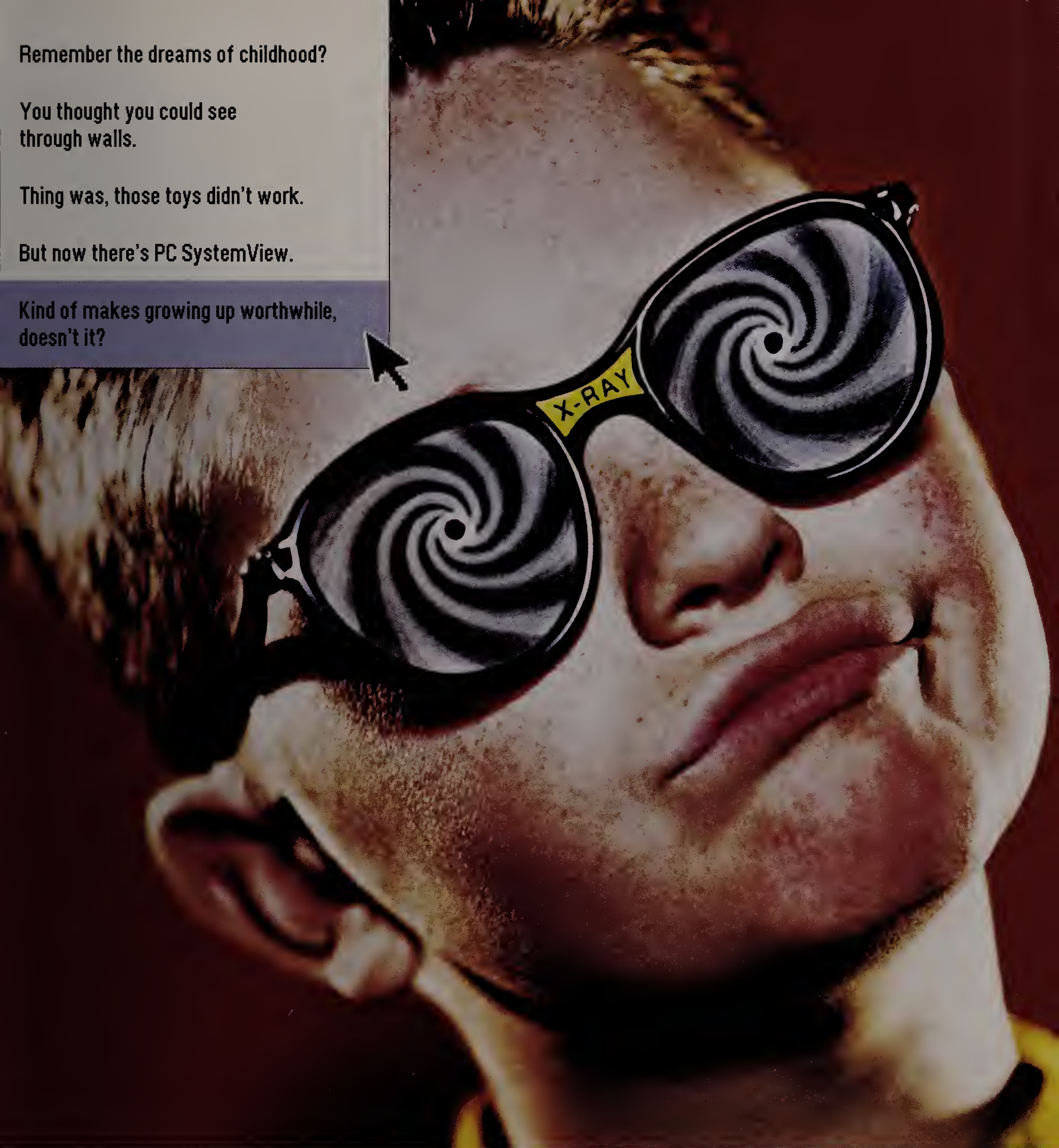
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The rise of the Internet is both a tectonic shift and a sea change: an event as jarring as the invention of the PC and the logical next step in the whole distributed technology/information movement. But CIOs seem to be having some trouble understanding the leadership model for the Internet—or that it might have anything to do with them. As pockets of Web activity sprout up around their companies, many CIOs remain cautious, adopting a wait-and-see attitude.

But the similarities to the PC revolution don't end here. CIOs would do well to remember not only the

early battlefields of distributed computing but what an enormous task it's been trying to rein in all the ragtag troops convinced that their way is the only true path to glory. (And who's to say the IS folks will even be given the opportunity this time, anyway?)

At CIO Communications, we've developed a new publication devoted to reporting on Internet and Web developments. During *WebMaster's* launch year, it has traveled as a supplement to *CIO*. I sincerely hope that our channeling the bulk of our Web and Internet coverage to this new publication hasn't contributed to the idea that this is something CIOs can afford to ignore.

Ironically, one of the things standing in the way of IS executives getting on-board may be the very business focus they've been encouraged to assume. Most CIOs have gotten pretty good at weighing risks and quantifying returns. With the Internet, there are some obvious risks, and the returns at this point can only be envisioned, not tallied. How do you justify that? (Please see "Sky Pilots," by Senior Editor E.B. Baatz, beginning on Page 42.)

But this isn't a passing fad, and you can't wait to see how it's going to shake out. From where I sit, this may be the Big Event for which CIOs have been in training. For a company to successfully exploit the Internet requires someone with a cross-functional, companywide perspective who understands the business issues *and* technology trends. Sound familiar?

So steel your will and assume a leadership position now, or, like the whole distributed phenomenon, it's going to slip out from under you, damaging your company's future—and yours.

Disagree? I'd love to hear your point of view. Send your comments to lundberg@cio.com.

Abbie Lundberg



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Wayne L. Levy

P.S. The WebMaster Perspectives conference will take place Aug. 11-14 at the Westin St. Francis Hotel in San Francisco. Meet and network with executives facing similar business challenges and opportunities and learn how to effectively conduct business for profit on the World Wide Web. For more information, please call 800 366-0246.

Coming In CIO

Out of This World

The Iridium project, a satellite network that will deliver wireless telecommunications anywhere on Earth, requires perhaps the largest commercial software development efforts in history—thousands of developers in seven countries piecing together 15 million lines of code. For the partners of international consortium Iridium Inc., software development is the riskiest piece of this monumental challenge, but halfway through the project, chief contractor Motorola Inc. is on time and on budget.

Culture Shock

CIOs at multinational corporations are out to simplify the process of buying information technology products and support for sites around the world. They want centralized sources, standardized pricing, volume discounts and easier billing. Some vendors are responding, but taxes, tariffs, salaries, state-run monopolies and international laws make global uniformity tricky, and not everyone can pull it off.

Internal Distress

The hacker has acquired a notorious reputation as the CIO's worst nightmare, but the biggest threats to security—estimates run as high as 90 percent of security breaches—are internal. And while most of the damage done isn't malicious, errors, omissions, poor training and carelessness exact a heavy toll. The keys to defense lie in detecting the hidden dangers and in involving the entire company to help plug the holes.



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HIRE EDUCATION

COMPANIES TRY BEFORE THEY BUY

From a buyer's point of view, test driving, checking under the hood and kicking the tires seem like pretty good ways to avoid getting stuck with a lemon. But would that strategy be quite as appealing if you were the car?

As companies start to demand more assurance of a candidate's potential fit during the hiring process, more applicants for IS positions (including those at the CIO level) are being required to "audition" before key executives, hire on for temporary "tryout" periods and even go through psychological analyses before receiving a formal offer for a permanent position.

"There might have been one in 100 cases a few years ago [that involved an audition or trial period]. Now we're seeing it in one out of every 10 cases," says Randall W. Clark, senior vice president of Lee Hecht Harrison and general manager of the recruiting firm's Hartford, Conn., and Holyoke, Mass., offices. "Essentially, companies want to see the person in action. They are saying, 'We want to try before we buy.'"

This sort of squeeze-the-Charmin approach can save employers agony and money—no drawn-out (and potentially litigious) process to fire

a dud, no lost productivity and, in many cases with a trial period, no headhunter's fee to pay if things don't work out. And for companies that cannot afford the time and expense of

lengthy training, a test can show how quickly a candidate can adapt to a new environment.

One candidate in a recent senior-level search that Clark handled was sent an overnight package on the Friday before his Monday interview. The contents outlined a specific business problem at the company and

LICKETY SPLITSVILLE

In less time than it takes to say, "I'm leaving you, Edwin, and I'm taking the fuel-injected Beemer and the houseplants with me," married folks in Arizona can officially call it quits.

The QuickCourt kiosk takes unhappy couples through a multimedia journey

to divorcedom, guiding them through the paperwork process so that they can get unhitched without representation. (So far, no sign of Zsa Zsa Gabor or Elizabeth Taylor at any of the machines, which should number 150 around the state this summer). The divorce kiosks,

from North Communications Inc., function as a sort of lawyer-in-a-box for people who may not want or need to invest in the flesh-and-blood version. The kiosks have also branched out into that other reviled career species—the bureaucrat, carrying out tortuously redundant functions

such as renewing drivers' licenses and auto registrations and issuing city permits. The boxes, equipped with stereo sound, video and touch-screen technology, answer the questions that would drive any self-respecting human to distraction. "Probably 80 percent of the

time people are standing in line at city offices and they're asking a question that has been asked before," says Michael North, president and CEO of North Communications (<http://www.infonorth.com/>).

The kiosks are even getting in the middle of Arizona Superior Court's land-

lord-tenant disputes, giving evicted tenants a legal response document that is printed in a ready-to-sign format. Rumors that the kiosks will be installed next to the coffee machines in McDonald's restaurants are unfounded, however. ■





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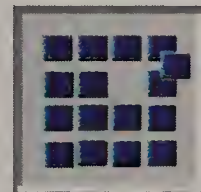
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TRENDLINES

STAGE ADVICE

asked him to make a formal 45-minute presentation offering concrete solutions. While that kind of approach may be cause for sweaty palms and deep gulps for some candidates, others welcome the challenge of a test that indicates what kind of problems they might tackle in the position if they are hired.

"It's not just the employer testing the employee. It's like a trial period for both before the marriage," says Mordy Levine, vice president of TeamAlliance Technology Partners LP, a New York-based software development and placement firm. Levine's firm typically deals with employers requesting that a potential candidate hire on as a temporary consultant before a permanent offer is discussed. About 80 percent of TeamAlliance can-

Here are tips from Randall W. Clark, senior vice president of Lee Hecht Harrison, on auditioning for a job:

- **Try to understand not just the task that the company is asking you to perform but why it is asking you to do it. What skills is the company looking for?**
- **Do your homework. If you are serious about the job, overprepare.**
- **If you are asked to give a presentation, consider using visual aids or handouts.**
- **Put yourself in the shoes of the management team if you are asked to offer solutions and analysis.**

didates who go through that process, commonly called a "try buy," are eventually hired full time.

Joe Agate was one of those hires who welcomed the chance to strut his stuff. He hooked up with ASI Financial Services Inc., a New York-based consulting firm that provides technical solutions for the financial industry, through TeamAlliance and agreed to consult as a Lotus Notes developer. He was hired full time after one week.

Agate says he wasn't nervous about his no-guarantees hiring; the probation period gave him a chance to confirm the initial good impression the company had made. "I found out in the interview that I wanted to work here, but it was nice to have the trial period bear that out," Agate says. "I

didn't have a doubt that they would like me. I didn't feel any pressure."

Regardless of whether he felt it, pressure was definitely being applied. His boss, ASI Vice President Detra Sarris, says the try-buy approach helped her fill a position immediately and also allowed her to feel more comfortable with her hiring choice. "I found myself being a little more particular with him than I might have been with a permanent employee," she says.

She said the try-buy option might have saved her some flubbed hires in the past. "In cases where you hire a person and it's a mistake, you pay the recruiting fee, and you lose, and then you're stuck figuring out how to deal with this person," Sarris says.

—Cheryl Dahle

KILLING NASTY NET GERMS

A traditional firewall and a strong policy against downloading files from the Web used to let CIOs sleep peacefully at night, knowing their companies were safe from computer viruses.

Unfortunately, that's not good enough anymore. For one thing, traditional anti-virus scanners usually identify a virus only after it has had a chance to do damage. And people often don't use scanners that search for viruses on command, because the programs are difficult to use or take too much memory and time. Furthermore, new server technologies that provide applets for fancier graphics, such as Sun Microsystems Inc.'s Java and Macromedia's Director, push potentially virus-infected executable files to users desktops without their control.

A new product from McAfee Associates Inc. in Santa Clara, Calif., called WebScan offers one way to combat this new



threat. WebScan automatically places downloaded files in a temporary directory in a special "quarantined" holding area, where it then scans each file for viruses. If a file is virus-free, the user is shown the "Save File As" dialogue box and can copy the file onto the hard disk. If a file is infected, WebScan alerts the user and provides the option to immediately delete the infected file.

WebScan may be used with CompuServe's Spry

Mosaic browser and e-mail package that come with the product or with other Web browsers, including Netscape Communication Corp.'s Navigator and Netcom's NetCruiser. The program can detect more than 5,800 viruses, including boot, file, multipartite, stealth, encrypted and polymorphic viruses. To download a sample version of McAfee's Web scanning product, visit <http://www.mcafee.com>.

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PERSONAL COMPUTERS

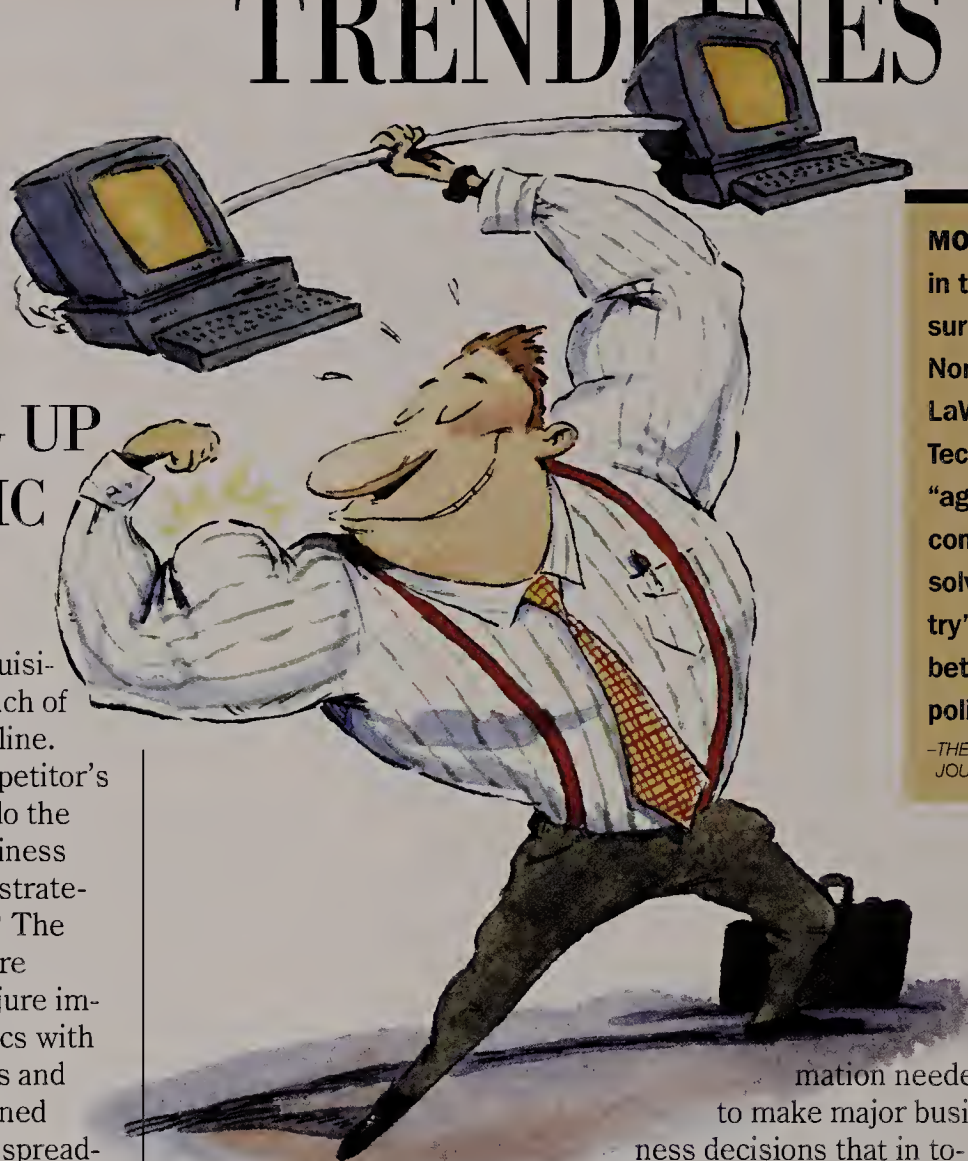
PUMPING UP STRATEGIC MUSCLE

Mergers and acquisitions. The launch of a new product line.

An assault on a competitor's market share. How do the real "players" of business make these kinds of strategic decisions wisely? The annals of business lore would lead us to conjure images of powerful execs with finely honed instincts and uncanny insight gleaned from stacks of paper spreadsheets and graphs. Today, a more accurate picture might be of a manager sitting in front of a PC.

Just 10 years ago, the personal computer was a rarity on the desks of middle managers and executives. Now that it is commonplace even at the highest levels of organizations, PC-based information retrieval services and statistical analysis tools have become indispensable to those who must make vital business decisions.

For instance, now that nine out of 10 managers at The Limited Inc. have computers on their desks, the women's clothing retailer based in Columbus, Ohio, was able to put them to good use when weighing whether to expand into new markets. The company relied on Investext, a service providing online company and industry analyses, to supply much of its research on the sporting goods industry. Aided by reports from prominent investment houses found on Investext, The Limited's



executives focused their attention on such things as total market size and the degree of market penetration by key players such as The Sports Authority, Wal-Mart Stores Inc. and Kmart Corp., says Jeffrey Allison, the company's director of financial planning and analysis. Satisfied that it could successfully exploit the sporting goods industry, The Limited acquired Galyan's Trading Co., a privately held sporting goods chain based in Indianapolis. The Limited plans to build the six-store Galyan's chain to 50 stores by the end of the decade.

Before electronic research services such as Investext, Nexis and the Dow Jones News Service, companies had to contact industry analysts individually and ask them for reports. The process of contacting several analysts and waiting for paper reports in the mail could take weeks. Research services enable managers and staff to quickly and conveniently uncover timely infor-

mation needed to make major business decisions that in today's ultra-competitive business environment must be made faster than ever. The first computer-based search tools were an improvement over paper volumes but required extensive training to master them. Those tasks were usually relegated to underlings, corporate librari-

MORE THAN one in three adults surveyed by Northlich Stolley LaWarre and Techtel Corp. "agree that 100 computers could solve our country's problems better than 100 politicians."

—THE WALL STREET JOURNAL, JAN. 19, 1996

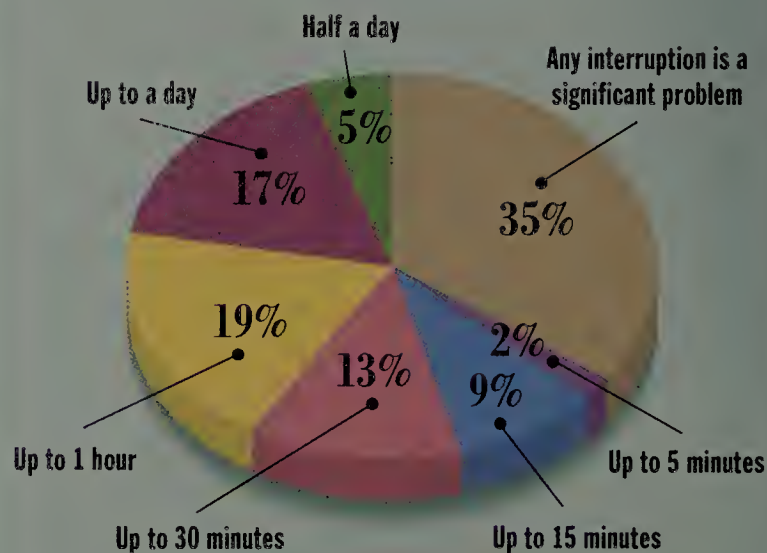
ans or research departments. Indeed, managers still assign research tasks to others, but the fairly intuitive search tools of today enable them to do the work themselves if, say, they want to modify the parameters of a search after the research department

has gone home for the day.

Middle and high-level managers are also more apt to use powerful statistical analysis tools that were once the sole province of universities. "There used to be a lack of trust in these tools," Allison says, because most managers didn't understand how they worked. Today, virtually every MBA graduate is well-versed in statistics, and many are familiar with statistical analysis software.

SPSS Inc., a statistical analysis software vendor to the academic and government markets since 1968,

How Long is Too Long? Managers' Tolerance for Server Downtime



SOURCE: INTERNATIONAL DATA CORPORATION, 1995

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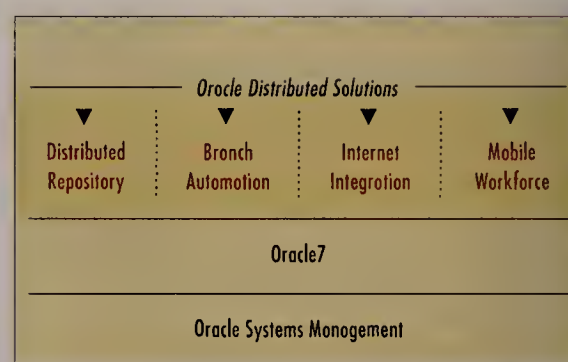
Distributed Features	Oracle7	Sybase	Microsoft
Number of Server Operating Systems Supported	45	3	1
Single Scalable Server Architecture for Personal, WG, SMP and MPP	Yes	No	No
Integrated Web Server and Database	Yes	No	No
Workgroup Suite with Integrated Web and Multimedia	Yes	No	No
Update Anywhere Replication with Conflict Management	Yes	No	No
Integrated Network Security	Yes	No	No
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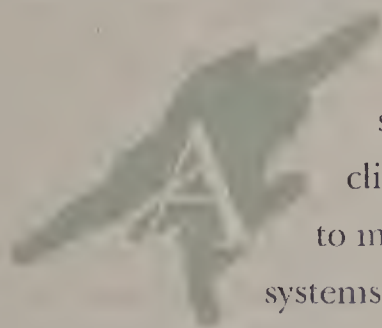
So far, there have been four stages of distributed computing: host-based processing, client/server computing, partitioned client/server computing, and distributed components. Client/server computing, the application development rage of the 1990s, lies on the continuum of an underlying application design concept known as distributed computing.

Prior to the 1990s, the term "distributed computing" implied many users sharing the same application resources. During this time, most applications were ultimately executed on like hosts over like networks and was presented on simple terminals. In this first phase of distributed computing, application development tools consisted of classic edit/compile/debug 3GLs and legacy 4GLs.

In the early 1990s, the growing popularity of PCs and LANs, combined with the GUI vogue, engendered a critical transformation in distributed computing. For the first time, the host server abdicated control over application processing. The initial client/server designs, often called "fat client" solutions, moved most application processing to the client. The server not only lost dominion over the presentation aspects of the application, but forfeited the processing of the business logic as well. In short, the server was relegated to the role of data host, and we progressed from dumb client to dumb server in this second phrase of distributed computing.

As the use of client/server evolved from simple de-

cision support applications with few users to mission-critical systems with larger user communities, the fat client methodology hit the "wall of scalability." Client/server tools could not handle all the requirements for performance or the added complexity. The solutions were 1) to move segments of application logic to the underutilized dumb server for execution, or 2) add middleware to abstract heterogeneity of network, operating environment and data access from the developer. These applications reflect the third phase of distributed computing.



As the use of client/server evolved to mission-critical systems with larger user communities, the fat client methodology hit the "wall of scalability."

The great leap forward

The fourth phase of distributed computing introduces reuse of components and advanced networked computing. The development process is evolving rapidly, between object-oriented development tools fostering internal reuse, and software components pro-

pellling the adoption of reuse from the public domain. Component-based development concerns itself with identifying and populating applicable components that abstract all but the final delivered functions and features from the developer.

Most GUI building is already component-based. Vertical industry business logic can be purchased from industry-specific libraries or suites, then tuned for an application's needs. Technology-handling components eliminate the need for the developer to understand the underlying workings of multimedia, asynchronous communications, telephony, docu-

This White Paper was prepared by Stephen D. Hendrick, Director of Application Development Tools for International Data Corp., and Evan Quinn, Research Manager for Application Development Tools. Mr. Hendrick manages IDC's Application Development Tools and System Level Software service, which includes databases, 4GLs, CASE products and data center software. IDC, based in Framingham, Mass., is the IT industry's leading provider of market research and consulting services.

ment management and even APIs.

In the near term, visual 3GLs and 4GLs will be used to glue components together into applications. Eventually, large components that act as agents for developing certain classes of applications will help developers through the entire development process.

Once this happens, developers will no longer have to worry about middleware, database, network, presentation and application logic or partitioning. Ultimately, components will enable developers to benefit from the experience of those pioneers who tackled the earlier challenges of distributed computing.

As applications grow increasingly complex, developers are demanding more distributed capabilities; higher levels of integration between databases, development tools and legacy data stores; and all of this across heterogeneous environments.

Oracle has invested significantly in distributed computing capabilities. Although Oracle products are often perceived as proprietary and closed from an architectural standpoint, this perception is not entirely well-founded.

In addition to the migration to a component-based paradigm, the corporate network will be ex-

tended to incorporate advanced network computing models, including the Internet, mass networked server deployments and mobile computing. As organizations investigate low-cost ways to improve both internal and external access to corporate information repositories, the client/server applications model will be extended beyond LAN and private-WAN-oriented network access.

This move to "virtual networks" will require RDBMS and tool suppliers to extend their client/server database architecture to incorporate Web and mobile networking. This migration to a larger "networked" computing model will require significant development efforts in order to link and insulate

the intricacies of Web and wireless communications from the database and applications development process.

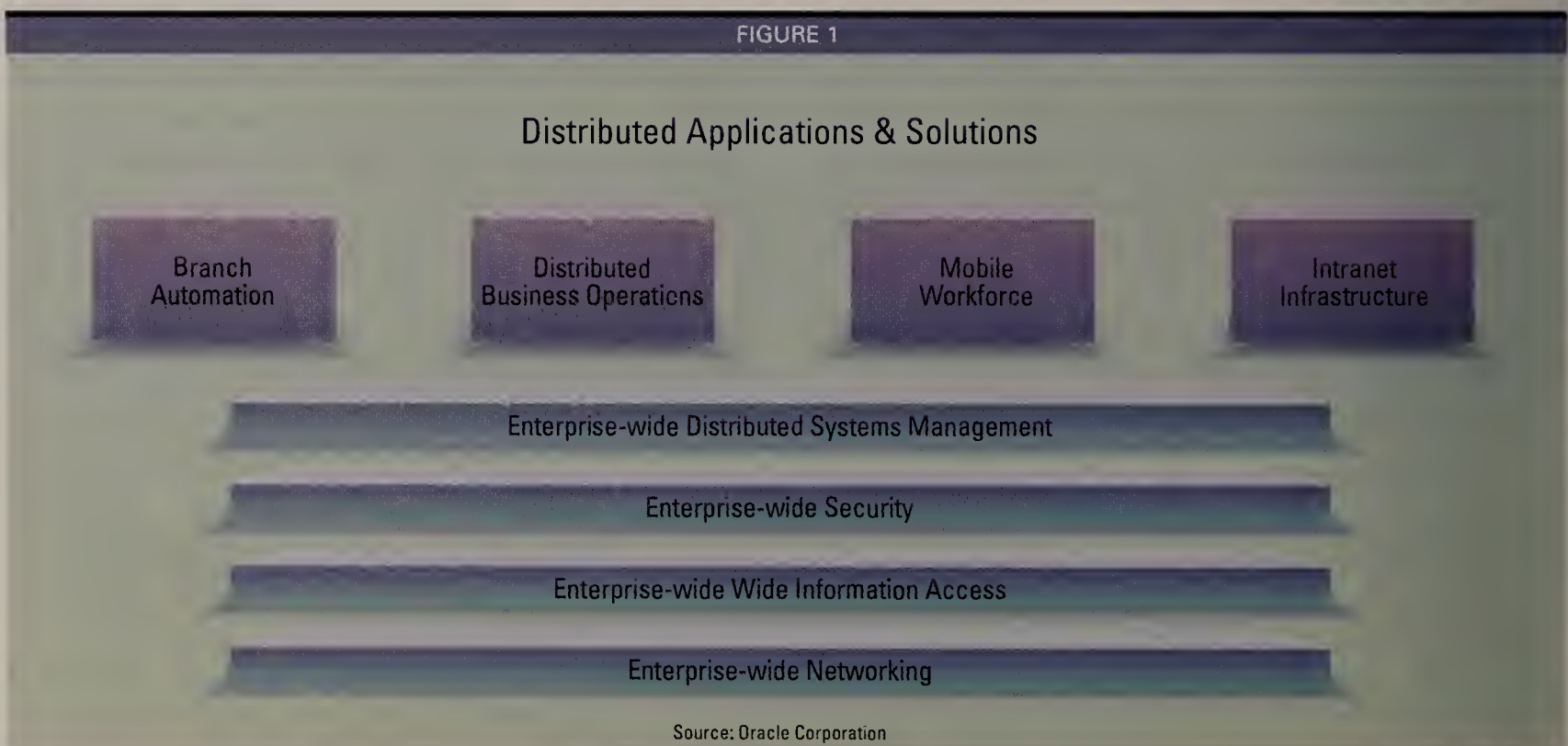
Scalable architecture

Operating environment scalability refers to a database architecture's ability to support a diverse set of operating environments and is a determinant of database utility.

The only vendor to provide operating environment scalability, Oracle does so by implementing the same kernel across all operating environments.



FIGURE 1



BUILDING NEXT GENERATION DISTRIBUTED APPLICATIONS

White
Paper

The logistics of using the same kernel across 16-, 32- and 64-bit operating systems reflects the considerable effort put into Oracle7's design. The drawback to this approach is Oracle7's larger footprint on desktop systems. However, given the trends of more memory-intensive operating systems and applications, and falling memory prices, this concern will become less urgent.

The value in operating environment scalability is the guaranteed consistency, portability and integrity it provides in data management. The importance of consistency and integrity should not be underestimated, given the complex tasks of managing heterogeneous systems and resolving inconsistencies when implementing multiple database technologies (potentially from the same vendor).

Another facet of scalability is an engine's ability to support an expanding user community and more complex application processing requirements with linear performance. True size and performance scalability can be accomplished only through a database operating environment that supports a multi-threaded architecture as well as symmetric multiprocessing (SMP), clusters and massively parallel processing (MPP). Oracle has worked closely with systems vendors such as Sun and has achieved truly linear performance across a Solaris-based SMP configuration with 20 processors.

Oracle7's thread management architecture affords multiple users concurrent access to an Oracle7 server. Parameters such as the number of dispatchers used to assign clients to a server as well as the manner in which threads are created or destroyed are tunable. Oracle's SMP solution scales easily and Oracle7 supports a variety of parallel operations. Servers can be added in an SMP configuration in realtime without shutting the system down. Oracle7 also manages its parallel processing capabilities automatically, avoiding continual administration to generate performance metrics to implement manual data partitioning decisions.

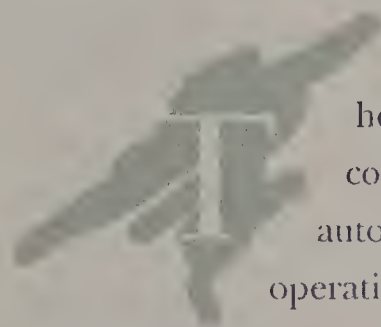
IDC believes that Oracle7's scalability, combined with its automated management of parallel operations, will prove compelling to developers who want a high-performance solution without the constant tuning that typically accompanies such products.

In addition, Oracle recently introduced its In-

teroffice product suites, designed to further facilitate mass server deployment in "branch automation" scenarios, integrating data management with other services such as Internet and groupware technologies.

Distributed data and replication

The concept of distributed databases has existed at Oracle for years, but the technology necessary to manage transparent updates arrived with Oracle7. The goal of implementing a distributed database is the same as for a component-based distributed application: to optimize resource utilization. Resource optimization is a function of distributing application workloads across operating environments and networks to maximize throughput and minimize cost. Despite the challenges that persist in managing a distributed database environment, Oracle has automated the key operations to ensure data integrity and to simplify application development.



The scalability of Oracle7, combined with its high level of automation in managing parallel operations, will prove compelling to developers who want a high-performance solution without constant tuning.

Oracle7 manages a distributed database environment via a global catalog that resides on every node. This gives every node processing autonomy but still facilitates a complete view of the entire environment. Updates to this catalog can be administered synchronously to ensure global catalog integrity.

Most mission-critical distributed databases rely on realtime or synchronous distributed updates. Most vendors, Oracle included, employ a two-phase commit protocol that ensures data consistency and integrity above all else. Distributed updates of this type can also be performed in a multi-vendor heterogeneous database environment by leveraging Oracle Transparent Gateways.

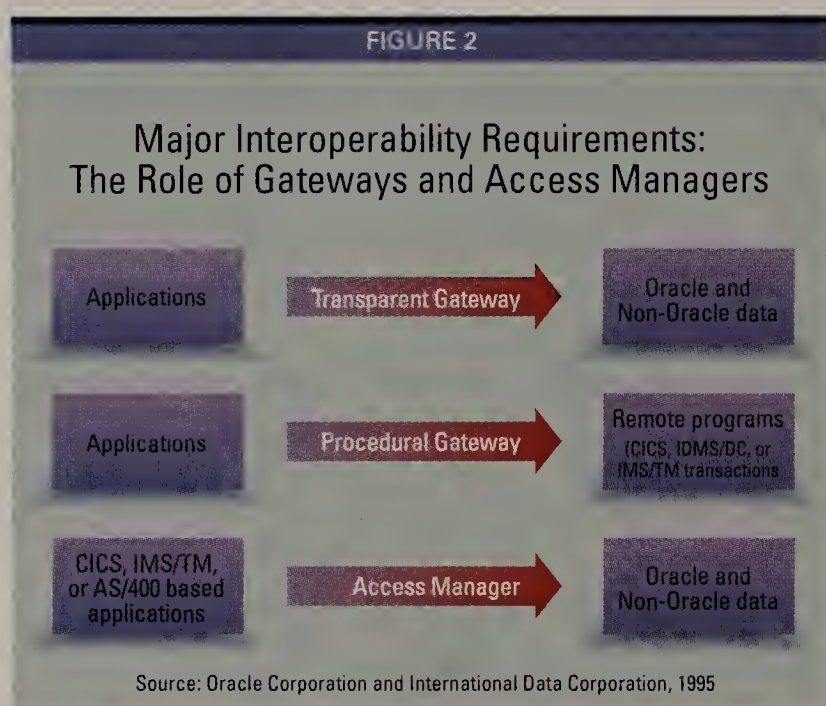
It is also possible to couple synchronous processing with triggers to effect realtime replication for transactions that require exact point-in-time consis-

tency of all copies. For developers who need distributed database capabilities but who can relax certain constraints regarding consistency and latency, asynchronous data replication is a key enabling technology. The consistency and integrity of synchronous replication are desirable features of two-phase commit, but the overhead and availability requirements of synchronous processing are a serious drawback.

Most business functions do not demand realtime updates. Asynchronous data replication is usually more appropriate for addressing near-realtime updates, especially for organizations that intend to

these more simplistic approaches cannot resolve update conflicts that occur when two sites attempt to simultaneously update a specific row of a database table. Oracle currently offers the most comprehensive peer-to-peer replication implementation, one that supports various pre-defined criteria for resolving update conflicts and even allows developers to write their own customized conflict resolution routines.

Oracle also uses deferred RPCs to deliver data replicates to target sites. Deferred RPCs and the queues that they foster are durable since they are protected by the backup and recovery mechanisms of the Oracle server. The queues are in fact Oracle tables. As a result, replicates cannot be lost and will be propagated to an off-line target system when it becomes available. However, SQL*Net remains a prerequisite for inter-database communication within the Oracle environment.



replicate data to and from large volumes of desktops and mobile devices. Consequently, asynchronous data replication is emerging as the preferred solution to most distributed database implementations.

Oracle's approach to asynchronous data replication uses triggers to generate replicates that are distributed to target sites using deferred RPCs. All of the asynchronous data replication administration functions are included in Oracle7. Oracle's scalable database architecture also ensures that replication is supported across all operating environments.

Oracle's asynchronous data replication implementation breaks new ground in several areas, including peer-to-peer replication and the use of deferred RPCs for delivering data replicates. Other replication solutions effectively support only parent-child or master-slave data replication. But

Gateways and access managers

Most corporate computing environments reflect a mix of vendor databases. Data management across a heterogeneous and multi-vendor environment demands methods to integrate these disparate data sources. As a result, database vendors must provide some measure of interoperability and integration across a multi-vendor database environment.

Database vendors have responded with gateway technology, which creates an interface to a foreign database and resolves underlying semantic differences between the native and foreign databases. Most vendors are now capable of seamless and transparent bi-directional communication across the RDBMS community coordinated through the dialect of the native database.

Oracle has been criticized for not building gateways to the engines of other database vendors. But the company has adopted a more realistic outlook. In fact, some of Oracle's Transparent Gateways are now benchmark products by which others will be judged.

Figure 2 lists the interoperability requirements that Oracle faces in today's market for development tools. To access legacy tool and database environments, Oracle employs gateways. Legacy tool access to Oracle data is performed through Oracle Access Managers, which function like reverse gateways.

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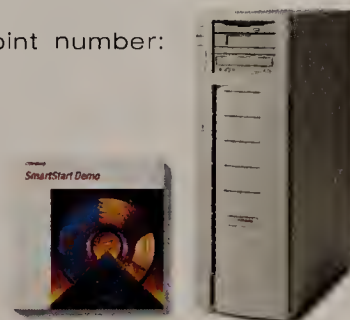
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Oracle integrates data from non-Oracle databases primarily through its Transparent Gateways, which address the differences between SQL dialects. Features of Transparent Gateways include datatype conversions, dynamic schema transparency, outer joins and outbound support for PL/SQL services such as triggers, stored procedures and user-defined functions (UDFs).

Oracle Transparent Gateways can also be installed on a platform other than the one on which the target data store resides. Although Oracle supports access to more than 30 different data stores, access to some of them is achieved via a version of EDA/SQL and is read-only. Transparent Gateways are suggested for use in ad hoc query and decision support applications, as well as those involving moderate OLTP.

For high-performance applications, Oracle offers a procedural gateway for APPC that can interface with a mainframe TP monitor and enable Oracle applications to front-end existing OLTP systems. The Oracle Procedural Gateway maps an external procedure call (EPC) to any APPC-capable system, including CICS, IMS/TM and IDMS/DC. No incremental programming is required on the host system. Utilities are provided to generate the PL/SQL code which maps the application request to the EPC.

Oracle has also developed the concept of access managers to ease the transition of data from mainframe systems to Oracle. An access manager ensures that legacy applications that utilize transaction managers can continue to access data, regardless of where it physically resides. Because the migration of mission-critical systems is often a lengthy affair, access managers are a solid concept.

In early 1996, Oracle will offer support for automatic, asynchronous replication within an environment of multiple database vendors. This new Replication Services product will provide GUI-based administration facilities to define and maintain an asynchronous replication environment between non-Oracle data sources and Oracle.

Distributed systems management

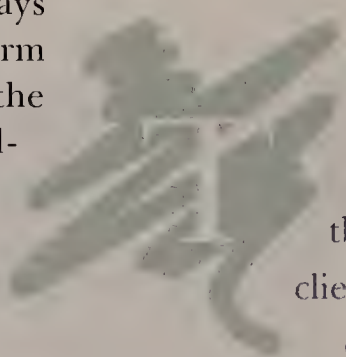
Managing a handful of additional servers may not be an unreasonable task. But the administration of hundreds or thousands of client-side devices will not be cost-effective unless a high level of automation is part of the solution.

To address this, Oracle released a series of products in late 1995 that provide software management in a distributed heterogeneous environment. Oracle's systems management product, Enterprise Manager, provides a foundation to ensure the manageability of the Oracle database for the enterprise. The Enterprise Manager family consists of systems management tools designed to manage the complete Oracle environment, including systems, databases, networks and applications.

Oracle Enterprise Manager is an integrated solution for managing a heterogeneous environment with an open client/server architecture. The scalable client/server architecture consists of a centralized console, common services and intelligent agents running on the managed nodes. The console provides a central point of control for an Oracle environment, with a tree-based navigator and map view simplifying many administration activities.

The common services provide a job scheduling system and an event management system, with the agent residing on the database server to execute the necessary jobs and events. Open APIs for both customer and third-party integration are available at both the console and agent levels, with complete SNMP enablement for integration with the major network management platforms.

Running on top of the console are standard DBA applications for user and group administration (including Oracle Software Manager, a workgroup systems management product for complete software distribution), as well as performance tuning, monitoring and diagnostic tools known as the Oracle Enterprise Manager Performance Pack. The console, agent, common services and standard DBA applications are included with the purchase of the Oracle Enterprise or Workgroup Server Version 7.3. The Oracle Enter-



The administration of thousands of client-side devices will

not be cost-effective unless a high level of automation is part of the solution.



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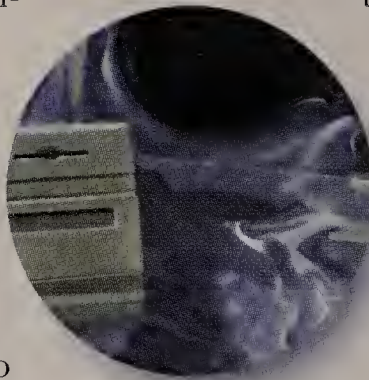
Oracle Software Manager performs the functions of software distribution, software asset management, license management, and remote server configuration and management by employing the use of intelligent agents and a distributed job scheduling capability. An agent — a remotely controllable event processor — can be instructed to perform many of the same tasks usually done by an administrator. These agents can operate in both synchronous and asynchronous modes and can operate in realtime, near realtime, or on a scheduled basis.

A store-and-forward architecture is also employed between the console and the agent so that any directives or notifications unable to be delivered due to a network or system outage will be queued for later delivery. Although software distribution is one of Oracle Software Manager's key capabilities, both software asset management and license management are derivative features which collect, monitor, and report software utilization metrics.

The product's remote server management aspects will facilitate a "lights out" database operation. This feature is particularly important for geographically dispersed workgroup servers that need ongoing management. Remote controlled tasks include database startup and shutdown, backup and recovery, import/export, load, tablespace management, performance monitoring, server configuration and control, and database schema/object management.

Oracle Replication Manager, which can be launched as an applet from Oracle Enterprise Manager, is a graphical tool that lets users configure, schedule and administer their replicated environment from one location. Its point-and-click interface lets users define groups of database objects that need to be replicated and managed as a unit. These objects can include not only tables but also their supporting objects, such as indexes, triggers, views and conflict resolution procedures.

After creating a group, users can drag and drop it onto other databases to add new replication sites to their environment. If objects are added or removed from a replication group, the changes are deployed at every site.



Connectivity products

SQL*Net is SQL-based middleware that has existed in various incarnations since 1988. The product provides connectivity between Oracle databases and Oracle tools or applications. SQL*Net abstracts various network protocols and operating system interfaces, creating transparent connectivity between Oracle products and applications.

SQL*Net also supports any number of protocols simultaneously through the MultiProtocol Interchange, which provides transparent protocol bridging for a single connection. This eliminates the need to standardize on a single protocol.

To facilitate the task of configuring a SQL*Net network, Oracle provides with SQL*Net a graphical configuration utility called Oracle Network Manager. This utility offers a walk-through configuration process and enables users to build their network definition simply by selecting icons from the tool bar and dragging and dropping them on a network map. The utility validates the user's definition for completeness and generates all necessary configuration files.

To further simplify the administration of SQL*Net, Oracle provides a directory service called Oracle Names. This stores service names in a central location so when changes are made to the underlying network definition, they need be made only once and are instantly recognized through the entire network. Oracle also supports other industry directory services, including Banyan StreetTalk, Novell Netware Directory Services (NDS), OSF DCE Cell Directory Service (CDS) and Sun NIS/Yellow Pages, to provide service resolution in the Oracle environment.

SQL*Net's diagnostic logging and tracing capabilities help distinguish it from other industry middleware. SQL*Net comes with an administrative tool that enables the users to start, stop and interrogate the status of a component from anywhere in the network. SQL*Net also supports the Simple Network Management Protocol (SNMP), which enables administrators to monitor the Oracle7 server along with all SQL*Net components through SNMP-based

BUILDING NEXT GENERATION DISTRIBUTED APPLICATIONS

management consoles such as HP OpenView, Sun Solstice or Netview/6000.

Oracle security

As the move toward distributed computing continues, more information will travel over the wires between devices, much of it critical or sensitive. Measures will need to be taken to ensure confidentiality and security. The main challenge of these distributed environments is to address requirements for confidentiality, data integrity and authentication. Oracle Advanced Networking Option is a database option that provides network security capabilities.

Oracle's Advanced Networking Option ensures data confidentiality through software-based encryption algorithms, including RC4, DES and DES40 (a 40-bit DES version). Advanced Networking Option uses cryptographic check sums based on the MD5 algorithm. It also provides authentication for Oracle7 servers which support third-party authentication products such as Kerberos, SESAME and smart cards for token authentication. Oracle, in its next release, will support for biometric devices because of their ease of use and stronger authentication potential.

Providing security across the network is critical to widescale distributed computing. Oracle's addressing all the key issues related to network security, combined with Oracle7's NCSC B1 and C2 ratings as well as its ITSEC E3 rating, makes for a highly secure distributed data management environment.

Oracle's Websystem

The World Wide Web offers many opportunities to vendors: access to global markets, an ability to extend existing products and services, and a market for entirely new classes of products and services.

Today's read-only information access focus of the Web will quickly give way to read/write commerce-oriented activities with additional requirements for transaction processing, security and the development of complex Web-centric applications.

At the core of most Web applications is the need to manage information. The center of gravity for Oracle's WebSystem products is information management and the delivery of tools, solutions and services to manage information in a reliable, scalable

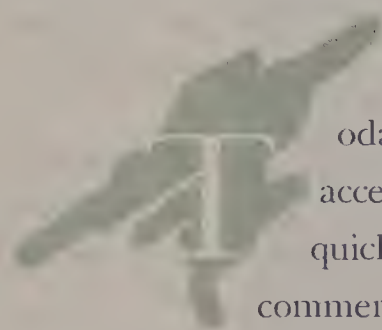
and open environment. Oracle currently offers three Web-related products: the WebServer option, the WebServer and the PowerBrowser.

The WebServer option provides Web connectivity for existing Oracle7 enterprise servers through the use of agent/listener technology. The listener listens for Web-based connections and supports any browser that uses the standard HTTP protocol. Oracle's agent technology provides access to Oracle7 from a Web interface. A toolkit provided with the WebServer option lets developers encapsulate and generate HTML instructions using PL/SQL.

Oracle's WebServer combines the WebServer option with an Oracle7 workgroup server. It is a packaged solution for workgroups that want to establish a dedicated Web server.

PowerBrowser is client software for browsing and building simple Web applications. It includes:

- Oracle BASIC engine, an HTML 2.0 compliant scripting engine (borrowed from PowerObjects) for building simple applications.
- Personal Oracle Lite, a standalone personal database designed for mobile deployment, managing personal Web access, saving URL data and navigating the Web.
- Personal Publisher, a Wysiwyg page layout editor that helps users create their own Web pages (without having to know HTML).



Today the read-only information access focus of the Web will quickly give way to read/write commerce-oriented activities with additional requirements for transaction processing and security.

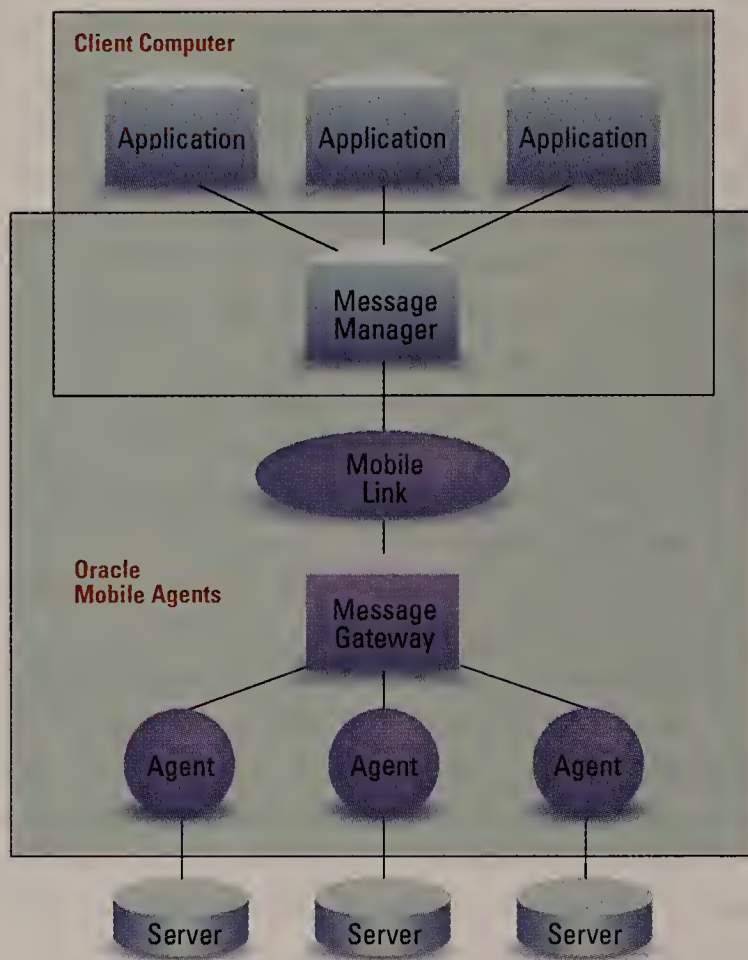
- Personal Server, which allows peer-to-peer document sharing in a workgroup environment.
- Network Loadable Objects, an interface that allows new document types and applications to be displayed and executed within the browser.

Building complex Web applications is still beyond the scope of today's Web-based development environments. But with its WebSystem products, Oracle

BUILDING NEXT GENERATION DISTRIBUTED APPLICATIONS

FIGURE 3

Oracle Mobile Agent Components



Source: Oracle Corporation, 1995

has gotten a jump on its competitors. By announcing that it will Web-enable Developer and Designer 2000 in early 1996, Oracle is rapidly moving to support serious application development.

Oracle has also licensed Java and will incorporate it into its browser. Although Oracle has taken a lead with its WebSystem products, many of its competitors have yet to drive a stake in the ground.

Oracle Mobile Agents

The rapidly growing mobile computing market presents unique challenges to tool vendors. This market is characterized by low bandwidth, low speed (high latency), multiple proprietary communication protocols and high cost, obstacles that make interfacing the mobile market with corporate networks and client/server applications a daunting challenge.

Oracle's Mobile Agents solution reflects a combination of agent and messaging technologies. Mobile Agents provide transparent interoperability between

mobile and LAN-based operating environments. Oracle will position Mobile Agents as a connectivity product, independent of SQL*Net. (SQL-based connectivity products are overhead-intensive.)

The components of the Mobile Agent system support the discontinuous and occasionally connected nature of mobile clients by leveraging server-side agents to collect information on the client's behalf for bundled delivery to the client during the next session. These agents collect and disseminate information by means of event managers and custom transaction handlers. This information is queued as messages in a gateway that sends and/or receives messages from the mobile client and manages system security through password encryption and message authentication. A message manager residing on the mobile client delivers messages to the appropriate client-side application. Figure 3 shows the key components of the Mobile Agent product.

As the mobile computing market matures, Oracle expects a shift to lighter weight clients (relative to today's laptops). Next-generation personal communicators and cellular phones will have enhanced messaging and data management capabilities. Consequently, Oracle is focusing on specialized applications for several vertical markets and various asynchronous processing models for these more simplistic devices. The next release of Mobile Agents will have better data synchronization capabilities as well as more intelligent agents.

Distributed computing features

Oracle's development tool strategy revolves around Power Objects at the personal and workgroup levels and Developer/2000 and Designer/2000 at the workgroup, department and enterprise levels.

In 1994, Oracle had licensing and maintenance revenues of \$436 million for 4GL development tools, making it the largest vendor of 4GLs in the world, nearly 50% larger than its closest competitor. Oracle has also rapidly gained in the hotly contested Windows operating environment arena, where its revenues are close to \$100 million.

Oracle's distributed computing approach for its development tools is an evolutionary one. The benefit of this approach is that Oracle delivers development tools that are highly intuitive and well-inte-



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do you have?

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the computer system should be ours.



Computer Systems

grated, and spans key aspects of the development lifecycle with bidirectional support for design and development features. As a result, Oracle technology addresses real-world problems without extracting a high price in terms of training and education. Oracle is positioning its tools to compete in the mainstream application development market, where it excels compared to most other 4GLs.

Developer/2000

The success of Oracle's development and design tools confirms that developers prefer to seek tools with tight database integration. Oracle database developers are predisposed to Oracle development and design tools as long as they are competitive.

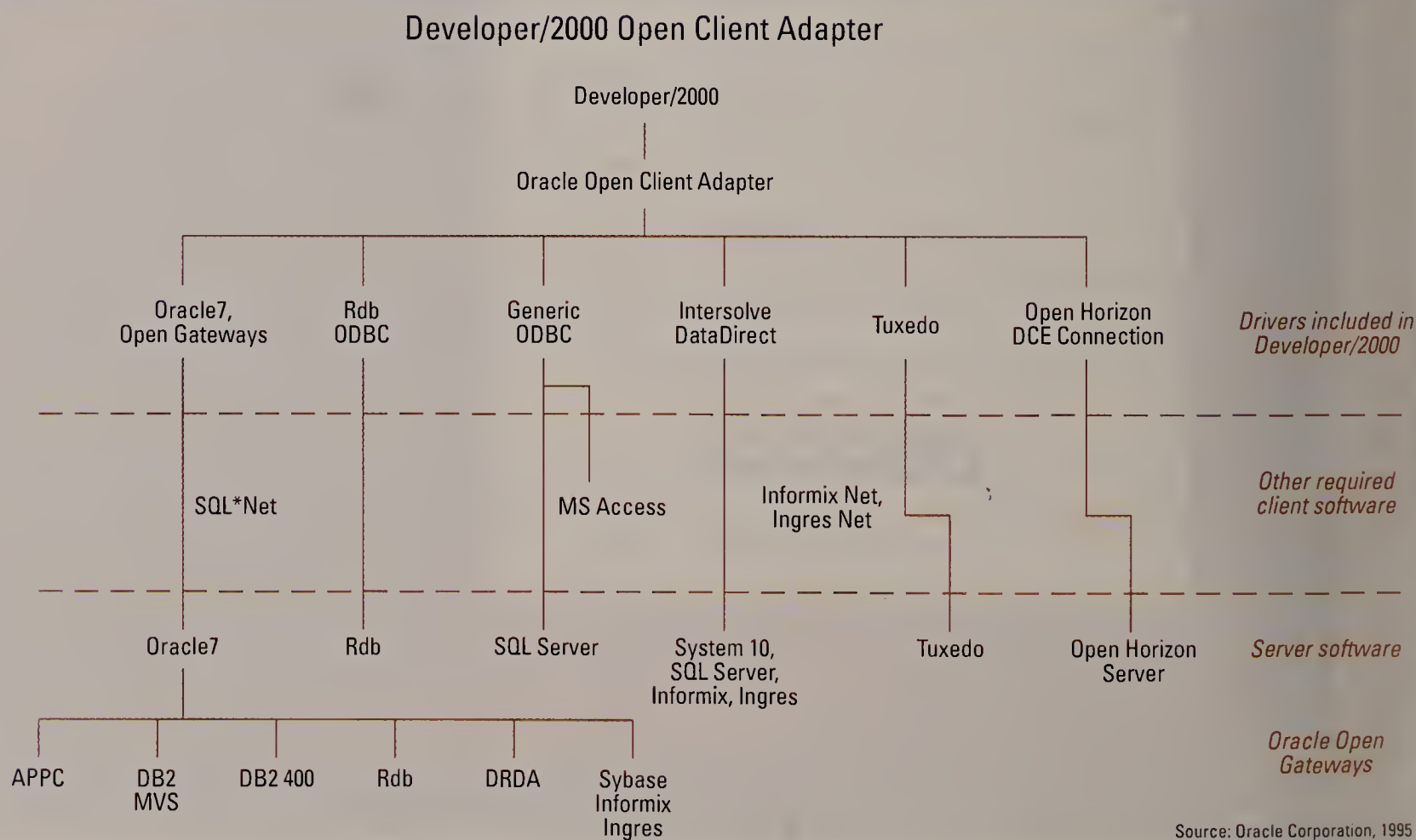
PL/SQL is the underlying scripting language for Developer/2000 and its predecessors. PL/SQL is highly proprietary, yet provides tight integration, control and power for developing Oracle-centric applications. Oracle revenues suggest the advantages of PL/SQL outweigh any drawbacks, but in the near term, Developer/2000 will remain a sale leveraged by

Oracle databases. Release 1.2 of Developer/2000 provides an Open Client Adapter that contains drivers for virtually all leading RDBMSs (via ODBC), Tuxedo and DCE as well as links to Oracle Transparent Gateways. Fig. 4 shows the drivers and databases supported by Developer/2000 Open Client Adapter.

Developer/2000 gets mixed marks in scalability. Its strengths are development flexibility, support of complex application development (via application partitioning), reuse capabilities (through VBX3 and OLE 2.0), multi-vendor database support, team support and the beginnings of component development. But it lags in its simplistic GUI builder, aging usage metaphor, inability to construct database independent server logic, generation of compiled code (not just p-code), and object-based development. Release 2.0, due in mid-year, will go a long way toward curing these ills. Given the rapid pace of development of Oracle tools, users should keep faith in Oracle's ability to keep supplying a highly competitive 4GL.

Despite the average marks that Developer/2000

FIGURE 4



receives today, its ability to exploit the power of Oracle7 has helped to establish it as the leading 4GL.

Designer/2000

Designer/2000 is Oracle's response to demand for simpler design tools that provide CASE "lite" capabilities, which complement 4GL and RAD development. Windows-based Designer/2000 resides alongside Oracle's CASE* 5.x tools, which address Unix and VMS operating environments. However, Designer/2000 does share the same repository as Developer/2000 (and Oracle's CASE* 5.x tools) and is responsible for enabling much of the iterative forward and reverse engineering between the /2000 tools.

Designer/2000 consists of a process modeler, system modeler and system designer. System modeling and design is often viewed as a mere exercise in preparing for the "real" programming task. But the system generation and reverse engineering capabilities of Designer/2000, when linked to Developer/2000, will elevate the status of these preliminary development tasks. Designer/2000 now generates code for Developer/2000, Microsoft Visual Basic 3, Oracle7 and ANSI SQL (for foreign databases).

The automation Designer/2000 provides in constructing client/server systems is its best attribute. Although server-side code generation is database centric, Designer/2000 provides some transparent control over application partitioning by dragging and dropping icons. Designer/2000 also supports reverse engineering capabilities for Developer/2000 and other legacy applications written in Oracle Forms and Oracle Reports. Although synchronization issues between the logical models and physical code still exist, Oracle is one of the few vendors to provide complete, iterative life cycle development.

Because virtually all other DBMS vendors look to third parties for design tools, they typically lack the consistency and integration that is the hallmark of Oracle tools. The tight integration of Oracle design tools with Oracle7 and Developer/2000 will appeal to 4GL developers looking for added horsepower.

Enterprise development vision

Oracle's current product suite projects an inte-

grated solution as a result of leveraging a common programming language, carefully constructed external interfaces (APIs), and some common metadata management. What is missing from this architecture is a common infrastructure and more atomic basis for enabling application interoperation.



Oracle's next-generation product (code name Sedona) is based on object-oriented development techniques, providing Oracle an environment for the construction of atomic elements whose properties can be reused, transformed and inherited to drive the development of connectivity, database, design and development tools. These tools will all share the same architecture, giving users higher levels of consistency, interoperation and integration. Oracle's ability to communicate with external and legacy environments through encapsulation and other object-oriented tools will also be enhanced. Consequently, Sedona will deliver more power via a more intuitive and abstracted usage metaphor.

The Sedona vision will become reality over the next three years. Users will see the first signs of Sedona in release 2.0 of Developer/2000 and Designer/2000, vis-a-vis their use of class-level data models, object reuse and re-entrant wizards. IDC believes that Oracle's vision will reinforce its leadership position in the RDBMS and development tools markets.

Conclusion

Oracle's lead in the programmer development tools market reflects its supremacy in database technology, an ability to deliver competitive design and development tools, wide-ranging life cycle coverage, and a clear objective to offer unparalleled integration within an Oracle-centric development environment. Oracle recognizes the importance of addressing distributed computing needs and is attempting to establish a lead in all four stages of the distributed computing continuum. Only by supporting all four stages will Oracle be able to offer support for legacy applications, provide competitive products with the capability to build today's complex applications, and provide a migratory path for users who wish to leverage the power and flexibility of newer tools and development techniques. ■

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— Peter Kastner, Vice President, Aberdeen Group

Distributed Features	Oracle7	Sybase	Microsoft
Number of Server Operating Systems Supported	45	3	1
Single Scalable Server Architecture for Personal, WG, SMP and MPP	Yes	No	No
Integrated Web Server and Database	Yes	No	No
Workgroup Suite with Integrated Web and Multimedia	Yes	No	No
Update Anywhere Replication with Conflict Management	Yes	No	No
Integrated Network Security	Yes	No	No
Integrated Mobile Client Support	Yes	No	No
Single Tool for Enterprise Systems Management	Yes	No	No
Gateway with No Code on Mainframe	Yes	No	Yes for DB2 only
Server Integrated Access to Legacy Data	Yes	No	No

For distributed enterprise solutions, Sybase and Microsoft simply can't compare. No wonder more companies turn to Oracle.

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TRENDLINES

saw its commercial business take off as the PC became a ubiquitous corporate desktop presence (particularly after the release of its first Windows version in 1992).

Corporate sales now total 58 percent of the company's annual revenues, says Larry Mathias, manager of public relations for the Chicago company. Companies put sta-

tistical analysis programs to many uses, including manufacturing forecasting, quality control and tracking patterns of customer service calls as well as regional and seasonal

sales. "More and more bosses are looking for accountability through reliable, quantifiable data," Mathias says.

—Peter Fabris

ERGONOMIC POSTURING

You already knew that Bill Gates was a bazillionaire. You knew he was the head of a revered and feared supercompany. But did you know that Gates has a gravity-defying derriere?

Yes, it's true. Thanks to BodyBilt Seating Inc., located in Dallas, Gates and other celebrity heavy-sitters such as author Judith

Krantz, actor Dustin Hoffman and screenwriter Michael Crichton recline in chairs designed to position their posteriors at the same angle that the body naturally assumes in a zero-gravity environment.

The chairs, which start at \$895 a pop and can cost as much as \$1,300, have 10 different adjustments geared to align your spine at

a 128-degree angle from trunk to thigh. The chairs' designs are based on NASA studies showing that astronauts floating around in gravity deprivation chambers tend to relax into this posture, says BodyBilt spokesman Mark Taylor.

While BodyBilt drops the names of some of the more famous seats it seats, the company's corporate clients include Hewlett-Packard and Microsoft.

Though these space-age seats typically cost more than the average office chair (and significantly less than the average gravity deprivation chamber), Taylor says that the chairs can save money by increasing productivity and preventing repetitive stress injuries associated with non-ergonomically correct work spaces. In fact, those champion bean counters at the Internal Revenue Service ran a justification analysis that showed an average productivity increase of 8 percent among its data-entry employees using the chair. That translates to a savings of \$7,403.03 per employee, according to the IRS.

Not a bad bottom line. ■

CAREER MOVES

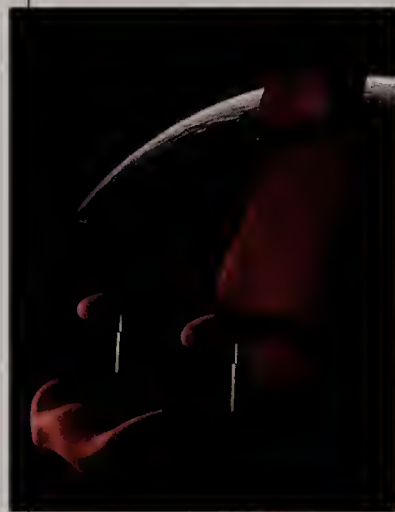
SHERI ANDERSON has been named senior vice president and chief information officer of Novell Inc. Anderson is now responsible for Novell internal information systems and networks worldwide. She was previously senior vice president in The Charles Schwab Corp.'s IS division.

PeopleSoft Inc. recently promoted STEVE ZARATE to the position of chief information officer. Zarate will oversee all aspects of PeopleSoft's information systems and voice and data communications worldwide. He was formerly PeopleSoft's vice president of human resources and network services.

Monsanto Co.'s board of directors has elected PATRICK J. FORTUNE as corporate vice president of information technology. As Monsanto's CIO, he is responsible for developing and overseeing the implementation of the company's worldwide IT strategy. He comes to Monsanto from Coram Healthcare Corp., where he served as president and chief operating officer.

JOHN M. KOST, CIO for the state of Michigan and deputy director for procurement and information technology at Michigan's Department of Management and Budget, is one of the 1995 recipients of Governing Magazine's Public Official of the Year Award. The award recognizes Kost's use of technology to make state government work better, including consolidation of the state's 15 data centers to streamline formerly inefficient processes and change the way Michigan purchases services.

Grant Thornton LLP, the seventh-largest U.S. accounting and management consulting firm, has named THOMAS J. ENGLISH partner and national director of information technology. English will be responsible for Grant Thornton's use of information technology, both in the delivery of services to clients and in the management of the firm's daily operations. English was previously CIO for Federal-Mogul Corp. ■



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More Methodology Madness

A recent "CIO Confidential" column, in which the author revealed his true feelings about consultants, produced a rash of responses from our readers—consultants and clients alike

The "CIO Confidential" column that appeared in our Nov. 15, 1995, issue, titled "Meet My Methodology," by W.F. Dyle (the pen name of a former CIO), took a rather harsh look at the consulting business. We printed responses to the column from a group of consultants in the Jan. 15, 1996, issue. Reactions from readers (some consultants, some consumers of consulting services), presented here following a brief summary of Dyle's original points, were mixed.

■ "A methodology is a form of linguistic bedazzlement with which consulting companies misdirect your attention while pursuing their core competency of pulling a rabbit out of your hat (also known as 'acquiring your assets')."

■ "I have heard that some big consulting engagements become tutorials for the consulting firms' young, ambitious post-MBAs, and you (or I) get some unplanned job-enrichment experience as teachers."

■ "[A government agency CIO] asked me about my consulting methodology. I told him I didn't have one but added that I would try to find what his problem was, figure out a way to fix it, make certain the fix would work and then send him a bill. That's what I do. He recoiled."



■ "I have yet to find a consultant (among the 'real' consultants I've known) who was paid on the basis of results measured, say, two years after they told you what you should do and you had done it."

■ "The key IT executives of the company my friend is advising had a relationship with the vendor through a previous employer; they say that

the vendor's new product is the 'only' solution that can meet their needs—and there are zero alternatives."

■ "The company I used to work for hired consultants because the people there didn't want any new ideas at all. What they wanted was job security: 'Look, boss, those consultants recommended by those other consultants and used by all the big guys told us we should do it. I mean, who are you gonna believe?'"

Been There, Done That

W.F. Dyle claims that consultants tend to tell their clients what the client wants to hear and use their methodologies merely to cloak their false advice in legitimacy. I admit to doing exactly what Dyle describes, since I have been a "working" consultant longer than I will admit.

When I started in consulting, my clients got my best advice, and I often got kicked out for giving it. I learned my "lesson" and did what Dyle describes to stay employed.

Now I am back to where I started because of two changes in my practice. First, many organizations have changed from command structures to team-based decision making. By choosing to work with team-style businesses, I leverage the other change: I now use a methodology that mandates the free discussion of ideas and issues in teams comprising clients and consultants. Operating in this new mode, both client and consultant easily prevent each other from returning to Dyle's world. And to make my commitment to quality



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Fred Lange
Principal Consultant
Cap Gemini America

Told You So

Consultants are good at telling you what you already know—even better if they are high-priced and based at least 500 miles from your headquarters; then they're *experts* at telling you what you already know.

Name withheld

The Cruel Truth

"Meet My Methodology" would be amusing if it were not so cruelly true. I have met CIOs who will shop around to find a consultant who will tell them what they want to hear. There is no limit to what they will pay to get confirmation. They will pay nothing for honesty, however.

I doubt that this pattern will change in any of our lifetimes. But then, I'm just a cynic.

Earl H. Kaplan
Independent Consultant
Health-care Specialist

Tool Time

W.F. Dyle gets a round of applause from me. His observations support my perspective and sentiments, and echo those I have heard in the glass-lined halls of data centers. What is amazing to me is how Dyle's viewpoint never seems to penetrate the marble walls of the executive suite.

We need to take a fundamental look at the way we approach the whole issue of consulting. Certainly, consultants can be a very powerful tool for IS organizations, but they are only one of many tools. The ability to discern what, when, and for how long to use each tool is the quality that separates the marginal IS manager

from the brilliant one. I firmly believe that the only thing that separates one competing organization from another is its proprietary processes and the employees who execute them.

I know it's a vain hope but I do long for the day when management will break out of the box of "Guru du Jour" panaceas for all that ails corporate America. I hope Mr. Dyle has as good a security team as that of Salman Rushdie, since the Big Six must already have a contract out on him.

Kevin D. Huber
Vice President of Information
Resources, Entertainment Data Inc.

It's All in the Name

There are many in the business who call themselves "consultants" who are really just programmers or contract labor. Why or how this started I have no idea, but it is my pet peeve. There's also a line going around about "consultants" simply being "out-of-work former midline managers," and that doesn't help the industry either. Face it: A true consultant is someone who can think, act, teach and listen. Consultants bring deep and rich professional experience and knowledge to an organization that needs a fresh approach. It takes many, many years to develop the skills required of consultants.

The Big Six do not necessarily have the best consultants, at least in my experience in hiring them when I was a CIO. Nor do the small firms necessarily have the best. It's a combination of trust, working together, learning together and just plain, old-fashioned teamwork that makes a consultant successful.

It's true that many CIOs and general managers are very inexperienced when it comes to managing consultants. American business did not get in deep trouble overnight—nor is it filled with brilliant business geniuses.

I've tried a number of times in my career to do something about the overall image and professionalism of consultants—from starting a guild

to developing ethical guidelines to speaking on the topic. The problem remains. We (consultants) in the industry must learn to do a better job of educating our clients and of setting standards. And we must somehow change the perception of consultants as the "bad guys/gals" for delivering the truth that nobody was willing to speak about before.

I'm pleased to see that your magazine has opened up the subject for some discussion.

Barbara Taylor
Management Consultant
Rainbows & Miracles, etc.

The Money Isn't for Nothing

I read W.F. Dyle's article with interest, having recently left the bonds of one of the largest information technology organizations in the world to start a small IT services business. We have avoided describing our business as "consulting" for reasons relating to the things Dyle outlines in his article. However, I do not agree with many of his conclusions.

First, a "methodology," contrary to Dyle's opinion, is more than merely a name for something. *Webster's* defines methodology as "a set or system of methods, principles and rules for regulating a given discipline, as in the arts or sciences." Anyone who expects to solve problems and help an organization with its IT must have a set of methods, principles and rules for doing so, whether they are formalized or not. The absence of one implies a lack of discipline and focus in accomplishing the objectives as agreed upon by the client and the service organization. (This is not to say that some organizations haven't built methodologies largely constructed to perform the task of separating an organization from its assets. However, let's not destroy the good with the bad.)

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If I did not believe with all my heart that we offer our clients a service that suits them better and more economically than what they could achieve using full-time staff, I would not be a part of this company. I am not in a small, highly skilled services organization for the money; I'm in it because I now have control over the level of service we deliver. I can freely provide information when all a potential client needs is a nudge in the right direction, and I can say, "No thanks," when a project just isn't going to work out.

Contrary to popular opinion, the money's not free and easy when you're running an IT services business. The business is rewarding, but it's also hard work. Articles like Dyle's don't make it any easier for those folks who need our help to convince their superiors that we actually can help. Because of that, I must say that I'm very disappointed in W.F. Dyle.

Stephen S. Hultquist
President
WorldWide Solutions Inc.

Gimme More

The author omitted the most important function of a consultant: to get additional work from the client. I am a former CIO turned "consultant," and I was astonished to learn how large consulting companies work. I was given an assignment that could have been finished in two days, but the manager of the consulting company insisted that it be dragged out for three weeks. I did it because I received more money for redoing the same thing.

In any event, I am now a full-fledged consultant and am looking for work.... As our positions change, so do our views. I hated consultants when I was a CIO, but now that I am one, they are the best thing that can happen to a company.

Bob Lobman
Independent Consultant

Tell It Like It Is

I certainly relate to many of the situations W.F. Dyle described. I am a systems consultant; I specialize in database technology and systems architecture. I have worked with five companies in the past year and have billed over 2,200 hours. I typically report to the CIO or his or her directors.

After reading Dyle's article, my conclusion is that either I am naive or he is cynical (or maybe both). It surprised me to hear a former CIO encourage consultants to say what their sponsors wanted to hear as opposed to reality. In similar situations—including at least twice last year—I faced up to my moral, ethical and professional responsibility to give my clients what they were paying for: my unvarnished judgment, expertise and experience. While I will not *publicly* express my full opinion in the client's work environment if that view conflicts with management decisions and directions, I *always* tell my sponsor the way I see it. The day I can't do that is the day I get out of this line of work.

And what have I reaped from this naive approach? My service is in such high demand that I didn't even take a day off in 1995—except for the birth of my daughter. I am respected because my clients know that I will tell them what I think; that's what they are paying me for. My colleagues frequently request me for consults. I have never spent a single day on the bench between assignments. My biggest challenge has been transitioning out of assignments without my clients feeling abandoned.

I understand that candor is not al-

ways risk-free. On one engagement, my platform recommendations for a database did not concur with what the vice president who hired me had been convinced by a hardware vendor was what he needed. I refused to endorse a solution that I felt was ill-conceived. As a result, the relationship ended much sooner than it probably would have otherwise, but my reputation within the IT community as a "straight shooter" was only enhanced by the encounter.

I believe that one reaps what one sows. If you aspire to reach the upper echelon of the technology and/or systems consulting business, you must play it straight and be honest about what you believe, then help your client regardless of which decision he makes. Speaking as one who sees consulting as a long-term career choice rather than something to do between "real" jobs, I have found this approach successful.

Thank you for such a thought-provoking article. In 10 years of reading industry magazines, this is the first time I have been motivated to respond to an article. I look forward to future columns.

Jeff Gentry
Systems Consultant
dbIntellect Technologies

It's All in the Hands...

The author of this consultant bashfest seems to be confusing many things—among them consultants and contractors, and methodologies and ethics. I know very few professional consultants outside of the megafirms that ascribe to the short-termism described here. That said, I guess I come out on the side of methodology.

Most of our clients know what their problems are but typically are unable to articulate them clearly or come up with a process to develop and then implement solutions. Methodology provides that process in a repeatable and auditable manner. Our customers frequently tell us that they value our methodology skill over industry and

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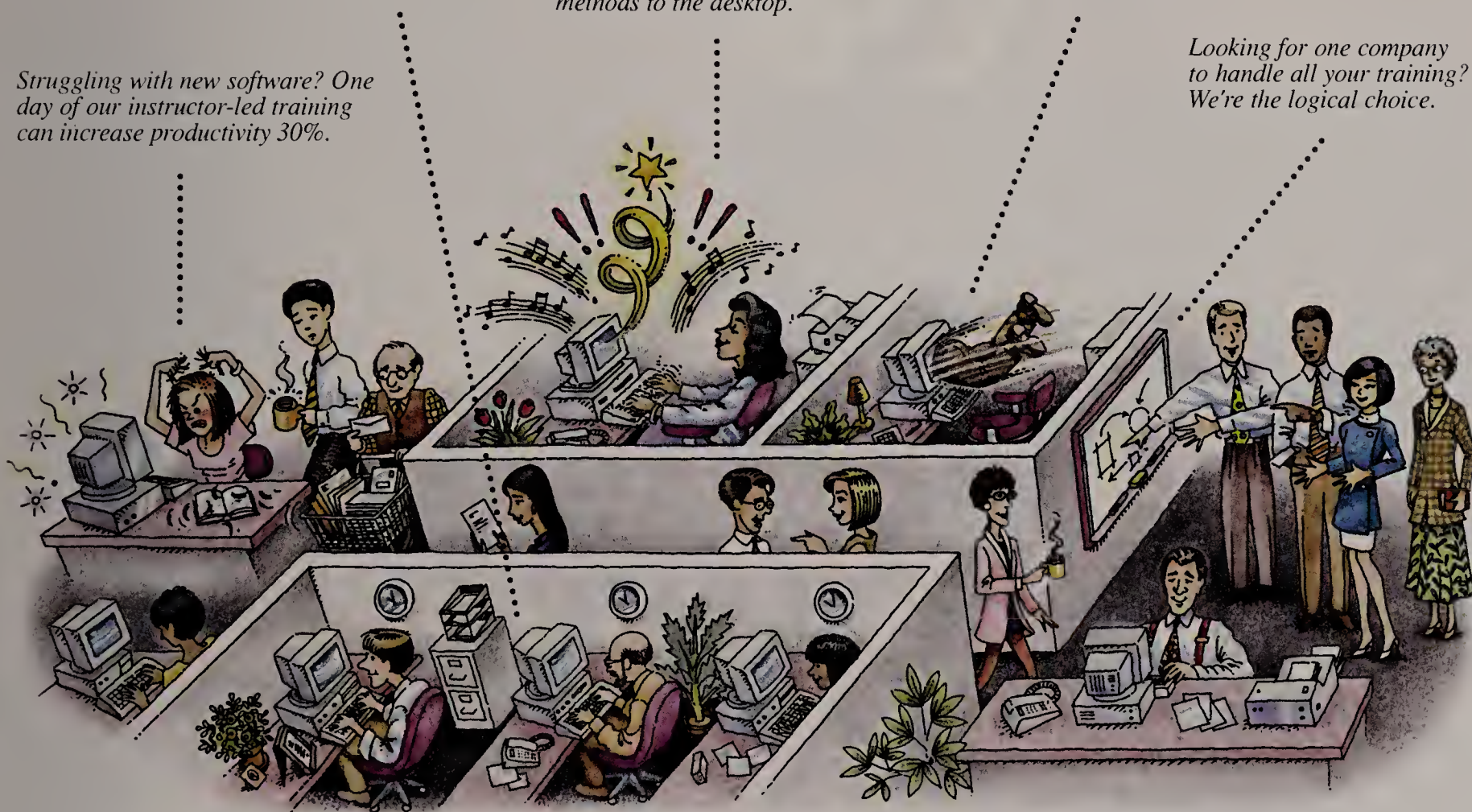
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functional knowledge. More pro-
saically, a good methodology is an at-
tempt to leverage the knowledge base
of a firm, something that aids client
and consultant alike. As my colleague
Thornton May writes, a methodology
is a tool, a necessary but insufficient
resource. In the hands of an expert it
can be powerful; in the hands of a fool,
at best it is ineffective, at worst dan-
gerous.

Paul McNabb
Vice President

Cambridge Technology Partners

Integrity Meets Human Nature

I was amused by W.F. Dyle's article
about consultants. Sadly, like all good
humor, there's a grain of truth in what
Dyle had to say. More sadly, the con-
sultants Dyle described make it damn
tough for the good ones.

First, let's define terms. My dictio-
nary says a consultant is someone
"who gives professional or expert ad-
vice." That eliminates those who do
things like programming, systems
analysis or project management. Dyle
calls them "neo-consultants." Right
on. I'm talking about management
consultants, of whom there are pre-
cious few in IS.

It would be very easy to tackle
each of Dyle's points. But I'd prefer
to do what I've done for all of my 26
years in *management* consulting,
namely, teach. Herewith are some
observations:

In 1969, when I was all ready to
start in the consulting "game," I had a
chat with a good friend and famous
IBM'er about joining me (misery
loves company, especially in a new en-
trepreneurship). His response: "I'm
not sure that the business world is
willing to pay for top-quality work by a
consultant." My response: "I'm going
to find out." I saw my friend again
several years later and was able to tell
him that, indeed, clients *are* willing to
pay for top-quality work—though
many also seem willing to pay for
really lousy work. Why was this? Hu-
man nature. Confronting that issue al-

most always means the client must
own up to having made a mistake—
poor choice of consultant, unclear as-
signment, lack of top-management
support, whatever. It's easier and
safer just to pay the bill and forget it.

In the midst of a severe recession,
in 1974, my business stood with one
foot in the grave and the other on the
proverbial banana peel. A really good
engagement would have been all it
took to move to safer ground. One
day, like a visit from heaven, the MIS
executive of a major broadcasting
company asked me to make a presen-
tation to him and his staff about my
approach to "career path planning." I
began by asking the group a number
of questions. Their answers led me
to say to them, "If you're telling me
that true career mobility is not in the
cards in your MIS shops, why would
you want to spend a lot of time and
money installing a scheme that
makes that perfectly clear to every-
one?" They had no response but
asked me if I'd go ahead and deliver
my presentation anyway. I told them
I didn't want to waste their time, so I
gave them a summary.

Afterward, in the elevator, one of
the attendees said to me, "You're the
first honest consultant I've ever met."
Eventually, they hired more "willing"
consultants—whom I knew to be un-
scrupulous—installed a very expen-
sive system and never used it. How
come? Human nature. No way they
were going to admit upfront that their
idea was lousy.

One reason you hire an objective,
expert outsider is to tell top manage-
ment what you've been telling them
all along—hoping the outsider can
succeed where you have so far failed.
What is the chance the consultant
will prevail? It depends. Is your idea a
sound one? Is your consultant con-
vinced it's sound? If so, is the consul-
tant an accomplished presenter who
can speak management English? Does
he or she have the depth of expe-
rience from which to answer the
really tough questions top managers
love to lob? If you answer "no" to any
of these questions, forget about it—

or else find another consultant. The
engagement will flop, Big Six or not.

Familiarity breeds contempt. Don't
expect to hire a consultant for a
lengthy engagement and still pre-
serve indefinitely the feeling that he
walks on water. Human nature
doesn't work that way. I did every-
thing I could to keep the mystique
alive with my clients. I never social-
ized or played golf with them, seldom
even had lunch with them. It helped
prolong the time until my feet got
wet but never prevented it. If your
current consultant is really, really
good, lay him off for a few months.

Once, after a long and delicate as-
signment, the CIO asked me how I had
avoided getting entangled in organiza-
tional politics (read "factional schem-
ing"). So I recited for him my Rule of
Communications: "The only person
who can tell me something concerning
the engagement and expect that I'll
keep it a secret is the person who has
hired me." This is a nontrivial regula-
tion for consulting hygiene.

How do you find an objective (read
"honest") consultant? Hire a rich
one. Really. Here's how one very fa-
mous consultant does it. When you
schedule his next visit, he hands you
your homework. Then, when he
shows up, if you haven't done the
homework, he leaves immediately
and sends you his bill. That's honesty
in action.

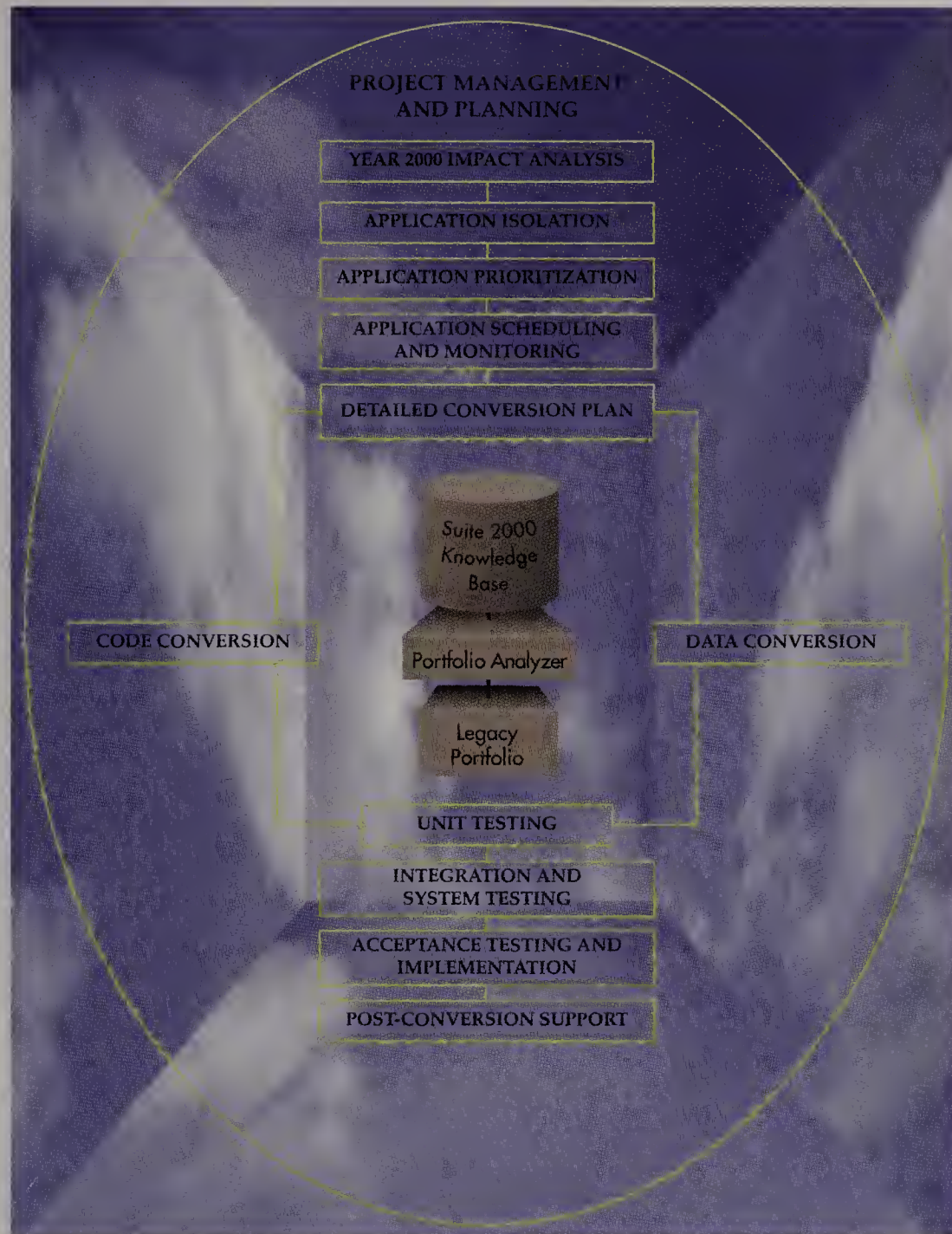
Dyle may find this hard to believe,
but there are still quite a few consul-
tants out there for whom integrity is
job one.

Nate Newkirk
Chairman
Newkirk Associates Inc.

EDITOR'S NOTE

Responses have been edited for
clarity and for space considera-
tions. For more viewpoints on the
consulting debate and the full text
of W.F. Dyle's "Meet My Methodol-
ogy" column, visit [http://www](http://www.cio.com/CIO/consult_methods.html)
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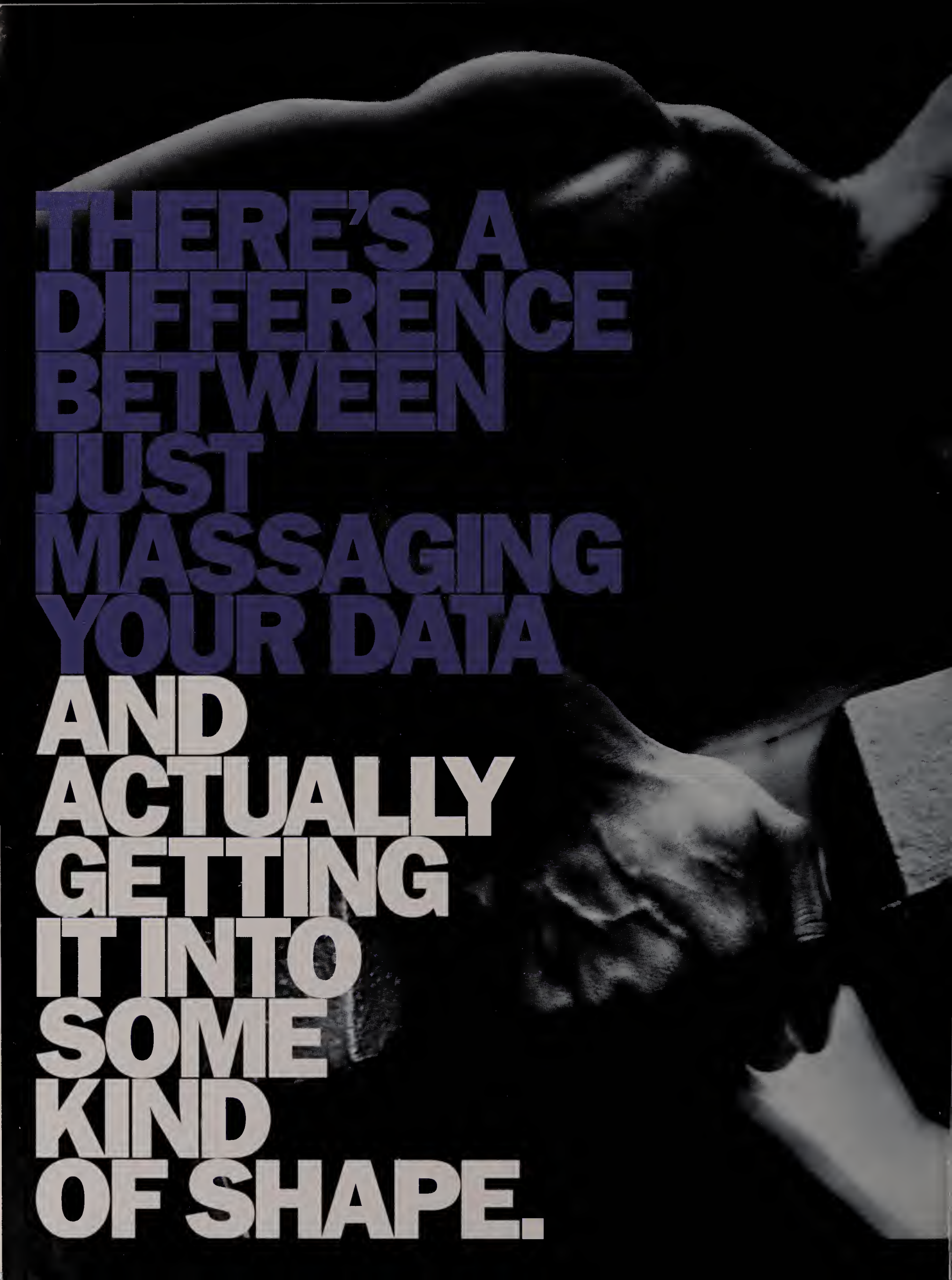
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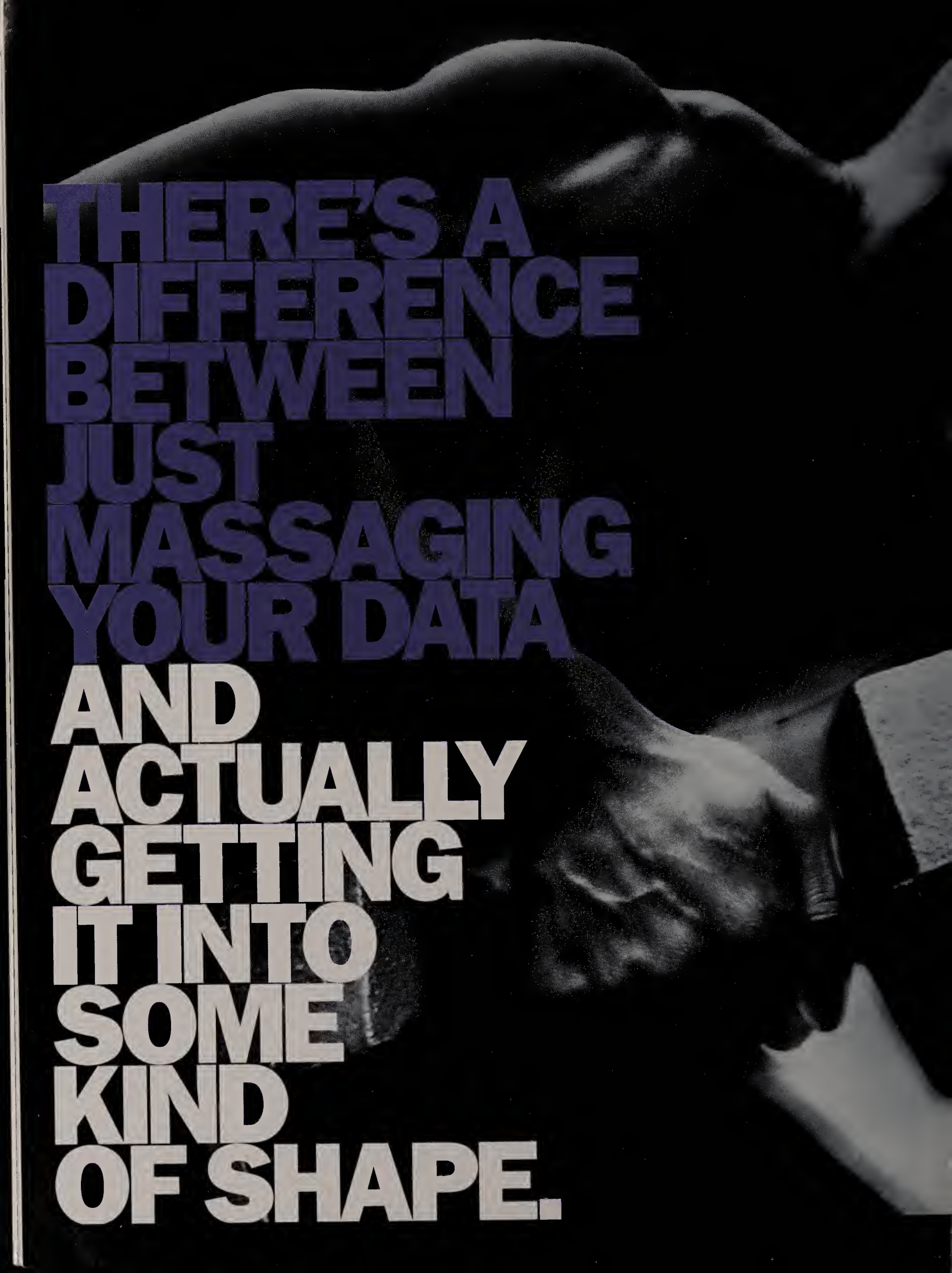
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BUSINESS CHALLENGES

- Seek corporate growth outside saturated Belgian market
- Gain international presence through brewery acquisitions, equity stakes and licensing agreements
- Achieve efficiencies by centrally managing far-flung operations accustomed to independence
- Solidify customer loyalty at home and abroad

Though its Belgian brands—Stella Artois, Jupiler and others—are exported to 80 countries, Interbrew's expansion strategy emphasizes equity stakes, acquisitions and licensing agreements with foreign breweries. The company owns operations in Hungary, Croatia, Bulgaria, Romania, the Netherlands, France and, via its 1995 acquisition of \$1.3 billion brewer John Labatt, the United States and Canada. Seventy-nine percent of Interbrew's beer volume flows outside Belgian borders.

The family-owned business tries to manage these dispersed operations globally, with the parent corporation's interests—including those in IS—prevailing over those of individual units. The benefits of a globalized strategy over an independent, decentralized one are well-known: Economies of scale exist through vendor relationships, common infrastructures and shared computing resources. Globalized management has also reduced the hidden costs incurred when local staffs spend time duplicating one another's IT efforts instead of brewing beer. Resistance, however, was inevitable in this history-steeped industry.

"Breweries by tradition have always been local, and they want to keep their own identity," says Jan L'Hoëst, corporate IT director. "They don't easily understand that someone 1,000 kilometers away has a say in what they do." Interbrew's acquisitions do retain their product identities—the local brands and their ingredients usually remain the same. But the operational and informational platforms and sometimes processes must change to conform with companywide standards.

INTERBREW WAS created when the two largest brewers in Belgium, Piedboeuf and Artois, merged in 1987.

Interbrew was born of a 1987 merger between the two largest brewers in Belgium: Artois and Piedboeuf. The venerable, family-run businesses hailed from two parts of Belgium that rarely see eye to eye—the Walloon South, where the language is French, and the Flemish North. Each had its own data center operations, and merging them for efficiency's sake was as delicate as the familial politics at the wedding of a Walloon count and a Flemish baroness.

When L'Hoëst joined Interbrew in December 1992, the company used 16 hardware platforms. Not surprising, his mission was to define and enforce global standards, methodologies and IS vision. But before he could tackle international consolidation, he had to coordinate and consolidate Interbrew's own domestic IT infrastructure, which was something of a hodgepodge.

"It's very hard to put two companies together, even though both may be in the same country, because they





I.S. STRATEGIES

- Consolidate scattered and redundant IS data center operations
- Institute a common, global IT architecture and software standards
- Introduce advanced and standardized technologies to acquisitions in technology-deficient markets
- Add value by being first to introduce outward-focused technologies such as EDI

are losing part of their identity," L'Hoëst says. Understanding the emotions and politics involved, he took his time merging IT operations. Preparation for the consolidation consumed eight months, during which the joint staff composed a report of all the implications, expected difficulties

and anticipated paybacks in minute detail. That report was then routed through management for approval and distributed as a proposal to eight bidding consultancies. "It's better to take time for preparation. Lots of projects fail because we jump into them without knowing all the issues. It gives people time to digest the process," L'Hoëst says.

In a politically astute move, L'Hoëst chose his consolidation project leader from the ranks of Piedboeuf, whose older data center was select-

ed to be phased out. The reasoning was that someone from that site would encounter less animosity from staff and unions. "All those people trusted him because he was one of them," L'Hoëst says. He did a

"Breweries by tradition have always been local, and they want to keep their own identity."



—Jan L'Hoëst

very good job in talking to the people, informing them what was happening and why."

The time spent in preparation paid off in fast execution. "We did two migrations in only 10 months, including one from a very old Unisys system to very new IBM technology. That's not so easy," L'Hoëst says. The payoff from hardware, software and salary savings was measured in hundreds of thousands of dollars and contributed to an overall reduction of Interbrew IS operating expenses of one-third.

The company has turned its attention to its data centers in neighboring France and the Netherlands in hopes that they can be managed more efficiently. Like the Belgian site, each has its own IBM AS/400 site and applications, yet less than 100 miles separate them. "We could run these from one place under one license and one manager," L'Hoëst says, adding that disparate applications must be migrated to Interbrew's SAP software standard anyway in the long run.

To coordinate consolidation among these sites, L'Hoëst is applying the same successful strategy used with Artois and Piedboeuf; for the project leader, he has tapped a Netherlands



INTERBREW OWNS operations in Hungary, Croatia, Bulgaria, Romania, the Netherlands, France and, via its 1995 acquisition of \$1.3 billion brewer John Labatt, the United States and Canada.

staffer rather than someone from the head office in Belgium. And again, L'Hoest refuses to rush. "I want to finish this project, but I told him to take his time," he says. This attitude might not go over well at a U.S. company, where quarterly shareholder deadlines rule schedules. But European companies, especially private enterprises, can more often afford themselves the luxury of time.

Like any multinational with designs on emerging markets, Interbrew inevitably finds itself operating in technology-challenged environments, such as former Iron Curtain nations. Ironically, the technological deficiencies make the people issues comparatively easy to deal with. True, the lack of common systems and the poor telecommunications infrastructures complicate access. "But in Western countries, the more communication facilities we have, the less we communicate. We have a [channel] zapping generation that finds it hard to concentrate," L'Hoest contends. "Eastern Europe is not yet so polluted; you can have dialogues with people rather than monologues." And Eastern European managers are less resistant to outsiders coming in to help them, he adds.

The challenges of setting up a sound IS shop depend on the locale. Most Eastern European brewery acquisitions already have systems. "The first thing is to understand what they have and how we can improve on that

situation," L'Hoest says. When necessary, Interbrew will propose infrastructure changes, as was the case in Romania. Other acquired Eastern European sites, such as Hungary's Borsodi Sörgyár brewery, had solid technical staff and systems already in place. "It was surprising since there was supposed to be no Western technology exported to communist countries," he notes wryly. Interbrew evaluates an acquisition's IS staff quality as well as architecture, and introduces common systems. Interbrew prefers to use local people in its IS operations, but in Croatia, for instance, finding people skilled in modern technology was difficult. The company compensates in these cases by sending Belgians to scout out the local talent pool and train new hires. In the applications area, Interbrew is propagating Soft-Cell's European Finance and Administration System, which L'Hoest calls a "mini-version of SAP," throughout its Eastern European sites. EFAS is an integrated business package that is more suitable for the smaller Eastern European sites than SAP.

All this introduction of technology, applications and staff can't help but spike IS budgets, and L'Hoest acknowledges that costs do rise in the short term when Interbrew takes over a brewery. But the investment is not huge by Western standards, he notes. "We'll do LANs or small Unix machines, or we'll pass down some

time, the IS organization must continue introducing new technologies. Now in the midst of Interbrew's first EDI project, L'Hoest envisions EDI relationships with suppliers and customers large and small. He even proposes putting PCs in pubs to track sales and facilitate reorders.

"Smaller clients can have difficulty reaching people in a brewery our size, but we could give them tools like e-mail" to facilitate communication,

thereby solidifying customer loyalty, L'Hoest says. Becoming the first Belgian brewer to use EDI or other outward-bound technologies pegs Interbrew as a leader in more than market share. "There's always a danger of being complacent when you're dominant; a smaller, faster

"There's always a danger of being complacent when you're dominant; a smaller, faster company can easily come up with innovative technologies first. The market leader should also try to be the IT leader."

—Jan L'Hoest



COMING UP

European Spotlight: English home improvement chain, Do-It-All

older hardware we have here." Still, the long-range goal of decreasing costs through more efficient IS operations seems within reach—Interbrew has pared its original 16 hardware platforms to four or five.

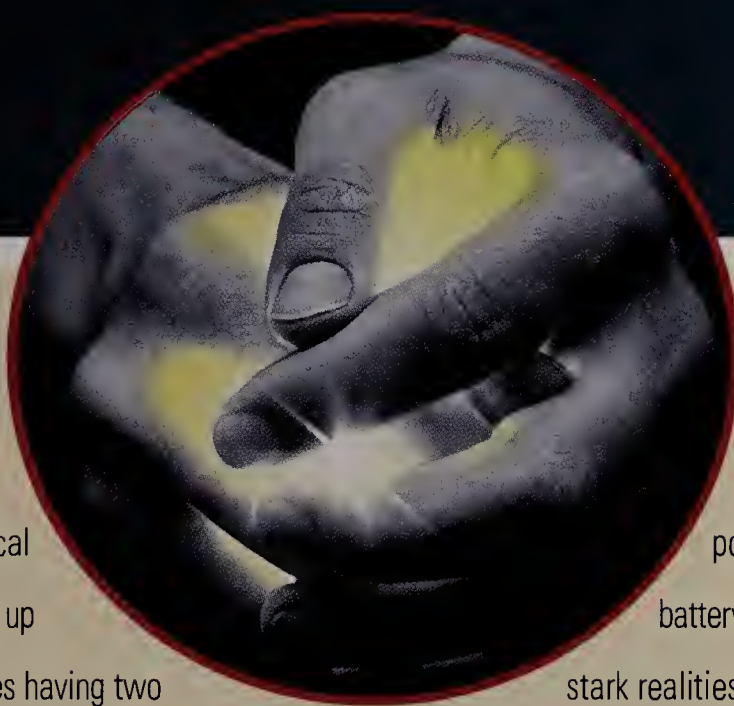
While centralizing and consolidating have consumed a good deal of



company can easily come up with [innovative technologies] first," L'Hoest says. "The market leader should also try to be the IT leader." Most CIOs would drink to that. **CIO**

Managing Editor Richard Pastore can be reached at pastore@cio.com.

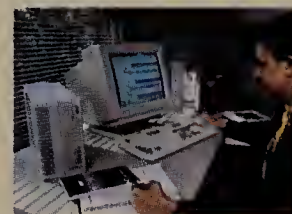
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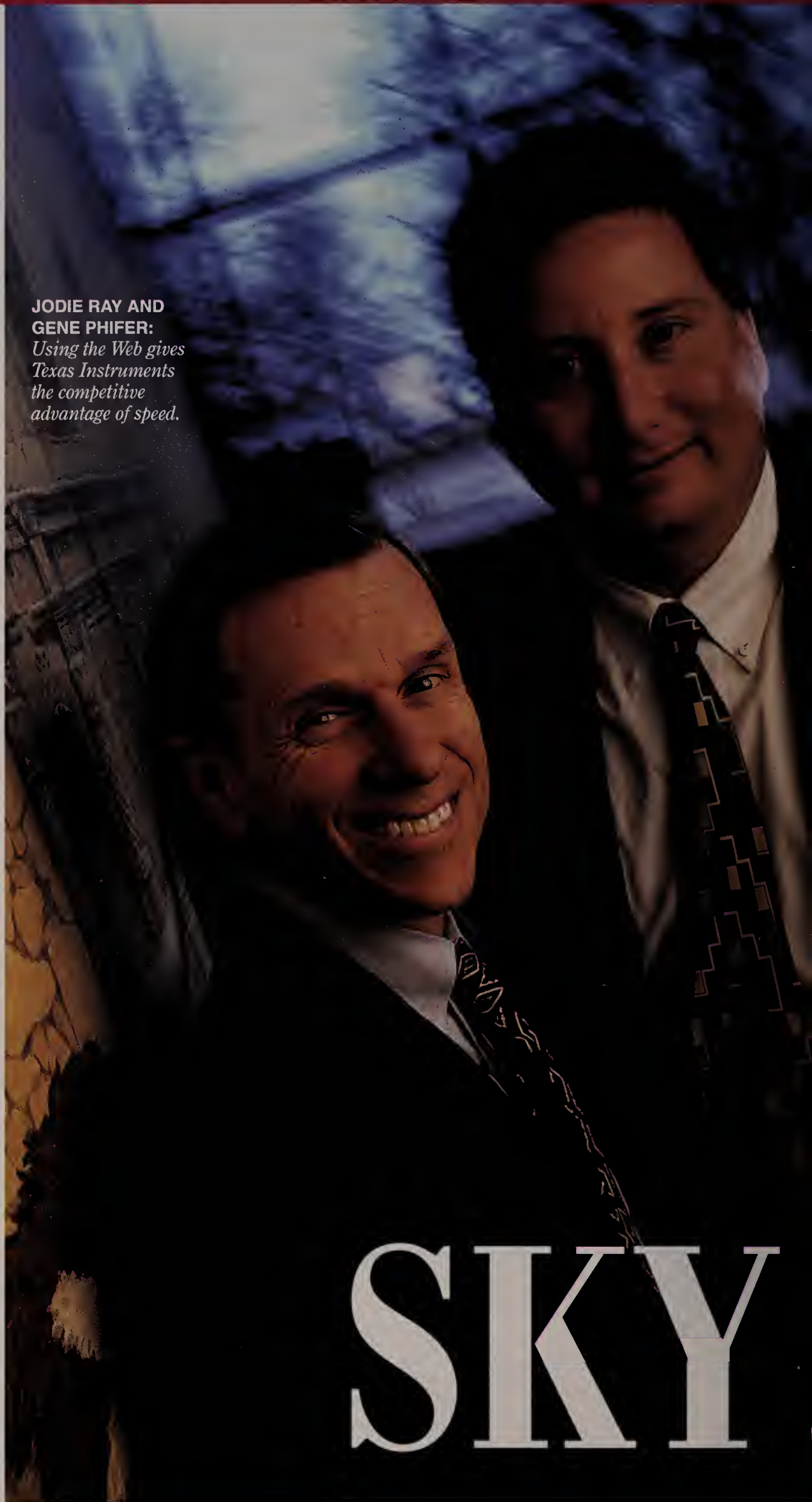
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EXIDE
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IS executives have lots of reasons for delaying the takeoff into the Internet: productivity, security and scalability. But advance-guard CIOs who are already navigating cyberspace warn that the countdown has begun.

BY E.B. BAATZ

**JODIE RAY AND
GENE PHIFER:**
*Using the Web gives
Texas Instruments
the competitive
advantage of speed.*



SKY

It's hard to imagine today, but at one time people had no idea what to do with that funny-looking box hanging on the wall. It would make a ringing noise, and it took who-knows-how-long before someone figured out how to pick it up and say, 'Hello.' Soon, however, operators were trained, and houses were wired. Party-line eavesdropping gave way to call-waiting civilities, although even as late as the 1940s and '50s, many corporate officers tried to control employees' access to this communications technology.

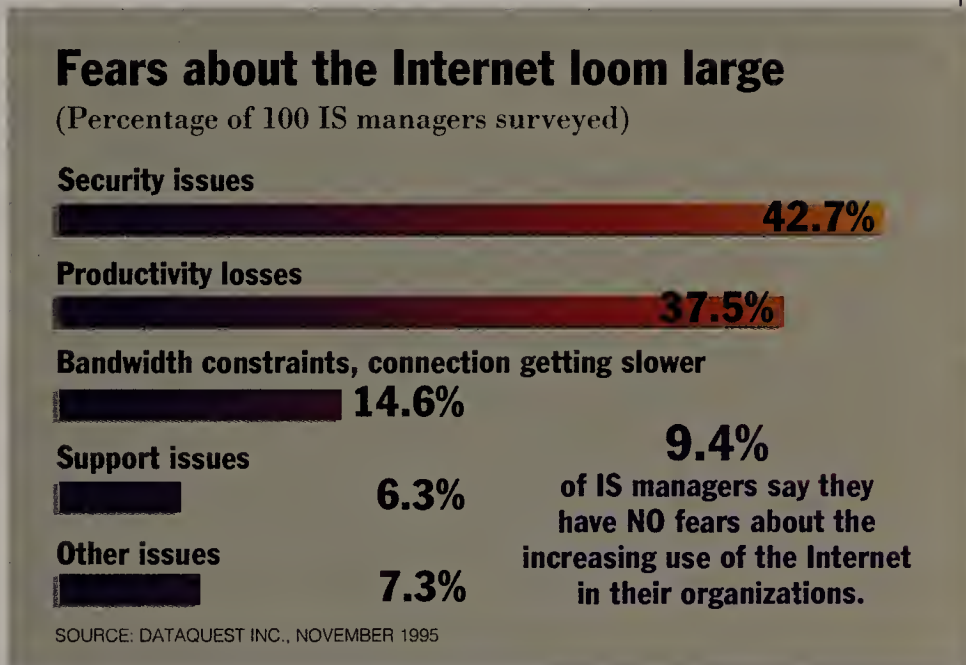
That was then, when the extraordinary invention called the telephone changed the world. This is now, and it's like the telephone all over again.

Organizations everywhere are coping with the rapid growth of computer internetworking technology, specifically the global open network called the Internet. In the past year, the phenomenal rise of the Net's graphical multimedia spinoff known as the World Wide Web caught nearly everyone off balance, leaving CIOs scrambling to adjust.

"The world has changed, the role of the CIO has changed, and the growth of the Web simply underscores this," says S.W. Hall Jr., CIO at the U.S. Department of Energy in Washington. "Successful CIOs are getting out of the control business and becoming facilitators. They're learning that you don't control the Net—you use it."

Indeed, some CIOs are making the radical adjustments to which Hall alludes. But others continue to struggle.

Consider the case of "Charles," the composite CIO representing all the executives interviewed for this article who wished not to be identified. Charles is a rather conserva-



tive executive of a midsize company, and, as is the case with many of his real counterparts, his thinking is sometimes stuck in the mainframe era.

And Charles isn't alone. According to a survey conducted last fall by San Jose, Calif.-based research company Dataquest Inc., the biggest fears of 100 IS managers include security breaches, lost productivity and, to some extent, ballooning costs. That hasn't changed much from the survey *CIO* conducted a year earlier. (See our special issue: "A CIO's

PILOTS



S.W. HALL: "Don't control the Net, use it."

Guide to the Information Highway," Dec. 1, 1994.) But leading-edge IS executives at the U.S. Department of Energy, Texas Instruments Inc., Digital Equipment Corp., Tyson Foods Inc. and elsewhere say these concerns are way overblown. Now, they say, is the time for the IS department to lead the way into the next technological frontier.

Yet CIOs on the forefront of the internetworking wave say they recognize the arguments of Charles and his Internet-shy brethren, having voiced these same excuses once themselves:

1 "It's my job to make sure these projects have a good return."

Marcy in marketing has been hectoring Charles and the IS department for months. "A little-known competitor in Finland just stole a major U.S. customer from us, and they used their Web site as the first point of contact. I need Internet access now so I can set up our own Web site," she complains. Charles isn't convinced. "I have a fiduciary responsibility, and these investment decisions take time," he replies.

But Charles is running out of time. The internetworking revolution is moving fast, and it's happening under the CIO's nose. "The Web is definitely emerging from the grass roots," says Peter Butler, IS manager for integrated information systems at E.I. du Pont de Nemours & Co. in Wilmington, Del.

When it comes to cyberspace, measuring the returns on the Internet investment needn't be a major concern. "We don't have a huge body of data or lots of formal studies. But the Web has helped us communicate and collaborate much faster, and that means lots of savings are going on," says Hall.

That's not to say that returns are not mea-

surable. At Digital in Maynard, Mass., for example, 300 information repositories have been integrated into one, with worldwide access to the data made available via the Internet. "We have saved \$5 million a year," says Kathleen C. Warner, director of Digital's Internet Program Office, which oversees the company's Net initiatives.

More important, many view their Web sites as a competitive advantage in a game of speed. For example, in the IS department, "architectural standards used to be published every six months. [With product development cycles shrinking], we just can't do that anymore. We have to change instantaneously," says Jodie N. Ray, CIO at Texas Instruments in Plano, Texas. "The power of going paperless [with Web tools] is more than just saving money; it's saving time."

Michael J. Eaton, CIO at Sandia National Laboratories in Albuquerque, N.M., agrees. "If you try to sell [Internet initiatives] on the basis of costs, then you're doomed. This is an enterprise-enabling technology." In other words, waiting for the ROI data may mean you're out of a job, Charlie.

"Surfing the Net is no different from reading The Wall Street Journal."

—Steve Hankins

Internet benefits come to light

(Percentage of 100 IS managers surveyed)

Accessibility/availability of information

70.5%

Convenience

10.5%

Ease of Use

9.5%

E-mail

5.3%

Global reach

4.2%

SOURCE: DATAQUEST INC., NOVEMBER 1995

IS managers are using the Internet as a part of their IT strategy in order to lower costs, increase communications and improve access to markets.

2 "It's important for the IS department to maintain control."

Kate in sales has a beef with Charles.

"The Internet is an important new tool for salespeople to use for gathering competitive intelligence and communicating with customers and prospects. I resent the fact that I don't have an Internet e-mail address for my office yet," she grumbles. Charles knows external e-mail is needed. "But we must deploy these new tools in a controlled and judicious way," he explains.

Unfortunately for Charles, the genie is al-

ready out of the bottle. Sales and marketing, followed by engineering, are often the folks who have pulled out the stopper, even though IS managers sometimes fail to recognize this trend.

According to Les Duncan, vice president and CIO for women's fashion retailer Express in Columbus, Ohio, a partnership with a Web fanatic in the marketing department has been key to his Internet efforts. "We don't look at the Internet and the Web as a technical project but as a business project," says Duncan. "We're driving business from our Web site into the store."

Most of the nascent efforts by corporations to exploit the Internet are fed so far by a need to reach more customers and ring up new sales. "CIOs are being forced onto the Web by the marketing department because that's where the business drivers are coming from," says Benn R. Konsynski, a professor at Emory University Business School in Atlanta and a long-time advocate of the Internet in business. "CIOs are generally more curious than serious about the Internet and the Web."

Within IS departments themselves, the Web is finally catching on as a way to communicate with end users instantaneously and more effectively via an intranet (a private, internal web). The 90 Web servers at Texas Instruments, for example, were joined in January by one more from the Information Systems and Services (ISS) division. The site has listings of products and services; news about what's coming; customer feedback and searching functions; up-to-date IS standards, end-user tools and library resources; an online help desk with phone numbers and frequently asked questions; and pointers to download software, among other features.

"As a marketing and communications vehicle, we recognize the Web as invaluable. It was simply a case of the cobbler's kids having no shoes," says Gene Phifer, senior IT manager, explaining why ISS's Web server was such a latecomer.

3 "Security is still a major problem, so we must continue to watch access."

Brian in purchasing is riding Charles, too. "I want to access a Web site from a competitor that has critical information about a mining shortage of titanium, but the site was charging for the data, and corporate told me I couldn't spend any money to pay for online data. The IS department is afraid that hackers

from our competitor will somehow get to my own database," he scoffs. "Security is my major concern, and it is my job to protect the company," answers Charles.

No one argues with Charles that security remains an issue. But IS executives active in cyberspace submit that these fears are inflated. "Yes, there are hackers, and they make great press, but CIOs should realize that the likelihood of someone stealing a packet from your Internet site is much less likely than



STEVE HANKINS : Tyson Foods was judicious in handing out access to the Internet until Netscape's popularity skyrocketed.

someone tapping your phone," says Jim McClanahan, manager of International Systems at Snap-On Tools Corp. in Kenosha, Wis. (See "Things That Go Bump on the Net," *CIO*, Dec. 1, 1994.)

Besides, new tools to handle security are coming out weekly. "We have rather rigorous security requirements, but we are looking into how the Web might interplay with our EDI strategy. Vendors like Premenos Corp. and Netscape Communications Corp. are building interfaces with RSA data security, and this seems to be a very encouraging trend," says George Sweigert, network services manager for electronic manufacturer In Focus Systems Inc. in Wilsonville, Ore.



PRAVIN JAIN AND MIKE SCHOONOVER: EMC Corp. expects the Internet to develop twice as fast as client/server technology did.

"With the Web, if it works for the local community, that's fine. Rigor is not what it's all about."

—Michael Eaton

4 "The Internet is affecting worker productivity adversely."

Bill in engineering is truly irate at the executive committee's newly instituted controls on the engineers using the Internet. "They're afraid that we're downloading porno sites and wasting time, but the only one wasting time is Charles, and it's my time he's wasting," mumbles Bill. "It's the executive committee's job to control errant employees," argues Charles.

Executives like Charles—particularly those who are among the Internet-uninitiated—believe that productivity problems are a major problem. Once again, however, Internet veterans in IS say that Charles is worrying too much.

"We took the philosophy that we would hand this thing [access to the Internet] out judiciously, but it got out of control as Netscape exploded," says Steve Hankins, vice president of MIS at Tyson Foods in Springdale, Ark. "That's when I got some push back from management who thought this was a toy." But, says Hankins, surfing the Net is really no different from reading *The Wall Street Journal*. "Most people play [on the Web] for a while and then get over it.

I was personally fascinated for three to four weeks, and now I use the Net mostly for competitive intelligence."

Clear policies and procedures help. In addition, says Hankins, the IS executive can more effectively recognize productivity pitfalls and find solutions if the IS department has been actively using the Internet and exploring the Web before the rest of the company. Indeed, Hankins and his youthful team of IS workers have been experimenting with the Web since June 1995 in anticipation of a corporate rollout.

Like many other companies using the Internet, Tyson Foods blocks Internet addresses that the company considers inappropriate. "We also know the top 10 places that people visit, and we can figure it out by individual IP addresses. We are working now on ways to assimilate all this information and communicate it to managers," says Hankins.

5 "OK, so security and productivity issues are moot, but what about scalability?"

Denise in production has a few ideas for the Web and is eager for Charles to get going. "I want to use the Web to replace all our training videos and production manuals. Why can't Charles make it happen?" she asks. Charles says he can't leap onto the Internet without making sure that everything will work for all the employees. "I can just hear them all—especially Denise—grousing about how slow the system is," groans Charles.

That way of thinking is old hat, say CIOs who have been exploring cyberspace. "Most CIOs have a conservative mind-set around stability and making sure systems are 'production hard' before bringing them to the masses," says Sandia's Eaton.

However, networked architecture and the Web are not the same. "With the Web, if it works for the local community, that's fine. Rigor is not what it is all about," Eaton says. "A production-ready application in IS is much more risk-averse and time-consuming than an HTML [hypertext markup language] application."

Texas Instruments' Ray chimes in. "When it comes to scalability, we have the money if the value is there. As people get excited about what this technology can do, then concerns about scaling up [from the local level to a larger community] will disappear," Ray says.

Digital CIO Dick Fishburn agrees, but he cautions his colleagues to bear in mind the strengths and weaknesses of the Internet. "The Net is a less expensive way to pass in-

formation along ubiquitously and efficiently," Fishburn says. "But if you have the need for highly reliable data transmission, then don't use the Internet, because you won't have subsecond response times."

6 "Vendors have been pitching interoperability for years. What if the Internet is just more vendor hype?"

Even lowly programmer Walter in the IS department, just three years out of college, is pulling an end run around Charles. He is designing a way for company employees to use the Web to keep up to date with the status of IS projects. As young Walter sees things proceeding, he thinks the Web is going to provide a platform-neutral way for every user, whether on Unix, Macintosh or Windows, to access databases and run applications. Walter is just waiting for the day—and he figures that it won't be long now—when the CIO gets fired, so he can proceed.

But Charles doesn't even know about Walter's project.

Lots of Internet-savvy CIOs are in for a rude awakening, says Konsynski. "The biggest danger is that IS professionals are viewing the Web as a quest to create an intranet rather than as an opportunity to use the appropriate mix of tools in the internet-working environment to deliver functionality to the business."

Konsynski adds that CIOs need to recognize the leveraging capability of the Web: SGML/HTML for document standards; browsers, such as Netscape and Digital's Alta Vista, as universal viewers on workstations; and TCP/IP as a communications protocol. "These are flexible and interoperable communications and multimedia tools. And that's just the beginning," Konsynski says.

Although the engineering department at EMC Corp., an electronic storage manufacturer in Hopkinton, Mass., developed the company's external Web site, the IS department is taking a leadership role in the quest for platform-neutral tools.

"I am in charge of the corporate data warehouse, and users are calling all the time saying that they can't find data," says Pravin Jain, a group leader for decision support systems at EMC. "So I wanted to figure out how to use the Web to gain access to the warehouse. We had tried using Microsoft Access, but it never caught on, and it was costly to develop, maintain and deploy. With this new application, everything is controlled by the server," he explains.

The pilot application is being tested by select end users now and, if they like it, the application will be getting approval shortly from CIO Mike Schoonover for full deployment. "We are running as fast as we can to keep up with open systems. We see how fast the Internet and intranet are coming around and suspect that the Net will develop twice as fast as client/server technology did," says Schoonover.

Indeed, Jain downloaded software from the Web, proved the concept two hours later, developed the full application in under one month and spent less than \$2,000 to do so. "The browser will become the desktop as the user will be able to download any application [called an "applet" in Sun Microsystems Inc.'s Java language] off the Web," predicts Jain.

In fact, Jain has ideas for six or seven additional applications using the Web, including an employee directory with photos and resumes and a Web multimedia training program linked to manuals and textbooks to help line workers learn how to build EMC equipment.

"CIOs are viewing the Web as a quest to create an intranet rather than a way to deliver functionality to the business."

—Benn Konsynski

Everyone is demanding Internet access

(Percentage of 100 IS managers surveyed)

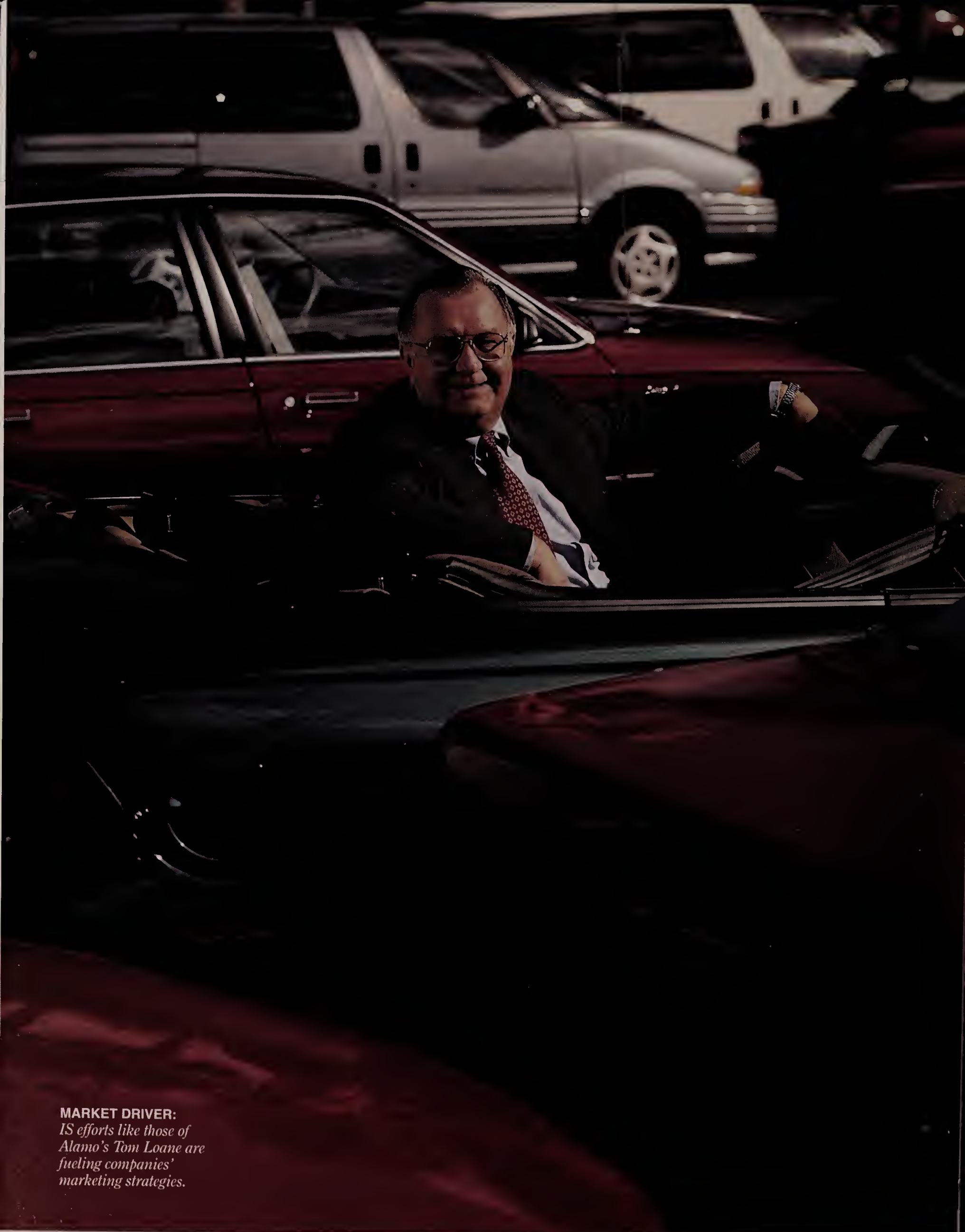


While experts say engineering and marketing are leading the demand for Internet access, 63.4% of IS managers see themselves as the Net's biggest customer.

SOURCE: DATAQUEST INC., NOVEMBER 1995

And if the speed with which companies such as Digital Equipment, EMC, Texas Instruments and Tyson Foods are moving to deploy the Web doesn't persuade Charles and all his laggard CIO friends to get hopping, well then, there's only one more piece of advice that advance-guard CIOs in cyberspace have to give: *Better get your resume ready, Charlie.* **CIO**

Senior Editor E.B. Baatz can be reached at ebaatz@cio.com. For a CIO's tour of the Web, visit <http://www.cio.com>.



MARKET DRIVER:
*IS efforts like those of
Alamo's Tom Loane are
fueling companies'
marketing strategies.*

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Alamo Rent A Car Inc. tries harder. It has to because of the way the business landscape has changed from the days when cars were relatively inexpensive and margins were generous. So, like similar businesses all over America, Alamo needs to identify its competitive advantage.

"For us, making money today depends on picking the right customers," says Tom Loane, CIO at the Fort Lauderdale, Fla., car rental agency. Alamo has turned to its database to examine the vacation activities of European tourists in the United States and discovered that, among other things, because Germans drive more, they consider driving comfort to be an important concern. Alamo's conclusion: Germans would be more inclined to rent roomier luxury cars. So now, when Alamo advertises its rental business in Germany, the ads include information on its bigger cars.

Burlington Coat Factory Warehouse Inc. is in the planning stages of a new marketing system designed to track families

BY ROSEMARY CAFASSO



**Imagine changing a tire
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SAY CHEESE: Mark Factor's IS team boosted sales of cream cheese for Au Bon Pain.

as they grow. The IS staff of the Burlington, N.J., discount retailer is developing a database application to create an online registry for expectant parents. Relatives and friends can use it to purchase baby gifts, and Burlington, in turn, can use the data to begin "life-changes marketing" by matching its direct-mail materials to the different stages of a family's development, says Garry Graham, Burlington's director of marketing. In 1999, the company will be able to kick off a direct-mail campaign highlighting toddler clothing based on its list of families with babies in 1996.

Au Bon Pain Co. Inc., the Boston-based chain of cafes, is fine-tuning its marketing strategy with data that involves, of all things, cream cheese. By analyzing point-of-sale data with query tools, the marketing group discovered that the company was not selling as much cream cheese as it had anticipated. When marketing compared point-of-sale data, it found that cream cheese wasn't selected as often as butter or jam. The group concluded that customers preferred the small, one-serving butter and jam packets to the larger, bulk-size cream cheese tubs. In answer to that finding, Au Bon Pain began offering cream cheese in individual packets. Then it relocated the entire cream cheese tray to the front of the store. Sales shot up.

You might think a Big Cheese CIO would have more important things to worry about, but that's precisely the kind of marketing that many companies are trying to execute

today. Whether the business is a manufacturer, a restaurant chain, a financial services company or a discount retailer, companies are scrambling to re-create their marketing efforts to be fast, precise and inexpensive. The bottom line: Precision marketing is the only way to contend with smarter and more demanding customers as well as increasingly fierce competition in all industry segments.

"It's all about flexibility," explains Dennis Fennessey, a partner at Deloitte & Touche Consulting Group in New York. "Companies need to know what's going on with customers and must try to adapt."

For most, the ability to create these quick-hit marketing efforts boils down to how effectively they use technology. Companies such as Au Bon Pain are able to make quick changes by analyzing sales data and determining what customers like or dislike. Because the marketing department can retrieve information quickly, it can test different merchandising strategies and immediately implement those that work. In Au Bon Pain's case, it was able to determine within eight weeks of its campaign launch that cream cheese sales were off, says Mark Factor, vice president of information systems. It took only another four

weeks to get initial changes in place. Without the database query tools, "it would have taken six months just to identify the issue," Factor says.

The traditional marketing structure—dominated by a large, centralized marketing organization responsible for big-picture strategies and expensive marketing campaigns—is a luxury few can now afford. Marketing plans used to be based on sweeping generalizations, such as, 'Women wash dishes.' "Companies relied on proprietary research, syndicated research and broad indicators to create mass-marketing programs," says Johan Sauer, a consultant with Computer Sciences Corp. in Cleveland.

But no more.

"Most large marketing departments are getting scaled back and becoming integrated into line organizations as opposed to being out there somewhere in an ivory tower," says William Randle, senior vice president and director of marketing and strategic planning at Huntington Bancshares Inc. in Columbus, Ohio. In the course of five years, Huntington has cut in half its centralized marketing group of 100 and reassigned marketing responsibilities—including marketing budgets—to regional managers.

Some companies are encouraging workers outside the marketing group to contribute ideas and handle specific projects. Other companies are making more official changes and adjusting reporting structures to reflect new goals for the marketing group. Alamo, for example, has re-

configured its corporate structure to signal how critical a role IS now plays in marketing efforts. Reporting to the vice chairman of operations until six months ago, Alamo CIO Loane now reports to the vice chairman of marketing.

Not that marketing and information systems groups aren't well-acquainted already; marketing has relied on technology—specifically databases—for years. But because technology now plays such a pivotal role in reengineering marketing, companies are demanding that IS groups in particular shift from a more supporting role to become fundamental contributors to the marketing effort. Today's technology is helping marketing accurately target customers, anticipate what they will want and get the message out there quickly and cheaply.

At Spalding Sports Worldwide Inc. in Springfield, Mass., the IS staff has worked peripherally with marketing since its CIO, Bard White, arrived at the sports equipment company 10 years ago. But the difference today is that IS now works as a direct collaborator—actually brainstorming ideas or developing software interactively—with the marketing group. Late last year, for instance, when a programmer came to White with an idea to develop screen-saver software as a promotional product, White turned to the marketing department for feedback. When marketing gave it a thumbs up, IS created a simple program that included a scanned image of a Spalding golf ball. The marketing group suggested ways to make it “spiffy” by adding images of Spalding's Top Flite golf ball logo along with images of golf pros such as Lee Trevino.

It's critical, however, that IS get involved in marketing plans early on to rebuff any ideas that will either cost too much money or be impossible to execute from a technology perspective. To prevent mistakes and delays in projects, Alamo's Loane says it is no longer practical to take the “waterfall” approach to marketing systems development, where marketing would give IS some system specifications and IS would spend months developing and then presenting the finished product to marketing.

Loane recalls one marketing idea to streamline the way overseas customers could book rental car reservations. The plan made sense from a marketing perspective because it would make life easier for customers upfront. But IS pointed out that Alamo's online reservation system required calculating the total price for these overseas customers when they returned the cars. That would surely delay the return process and was likely to annoy customers. The idea was jettisoned during the planning phase before any money was spent developing it, Loane says.

IS should get involved in marketing plans early on to rebuff ideas that are too costly or impossible to implement.

When he joined Au Bon Pain seven years ago, Factor remembers that spreadsheets were the extent of the marketing department's technology arsenal, conducting what-if exercises as best it could. Today's database analysis and query tools can give the company an inexpensive way to get a grip on what its customers want, says Maxwell T. Abbott, vice president of technical services for Au Bon Pain. Abbott points out that more traditional methods of marketing research, such as taste tests and focus groups, are far more expensive than desktop query tools. A focus group can range in price from \$15,000 to \$75,000, depending on how many sessions and cities are included in the program. Consumer tests can be costlier, ranging from \$20,000 to \$100,000,

Abbott says. “We view technology as critically important, and it is really the best and least expensive way we have to gauge consumer behavior,” he says.

Spalding's screen-saver promotion took about two weeks, from start to finish, and cost Spalding less than



STROKE OF GENIUS: CIO Bard White helped develop a screen saver for Spalding.

\$4,000 for the 3,000 screen savers it gave away, including about \$2,000 for labor and \$1,500 for materials, according to White.

In some cases, technology is becoming the delivery medium for the marketing message. Huntington Bancshares created a floppy-disk-based mortgage application process that enables customers to pick up a copy of the application on a disk, take it home and fill it out at their leisure. Huntington, which piloted the program in December 1995, plans to ramp up this new approach this year, says Cary Serif, vice president and manager of applied technology.

In this case, the floppy disk is a banking product. But that floppy also delivers a marketing message for Huntington, says Serif. It helps convey an image of Huntington as a bank that is convenient and has fewer hassles than other banks, which require paperwork and in-person interviews to complete a mortgage application.

Recent changes in technology that result in today's fast-paced, interactive marketing sessions and quick turnaround projects are driving the trend toward one-to-one marketing, sometimes referred to as micro- or precision marketing. Tools that deliver information to marketing teams at near real-time speeds help marketers spot customer trends and make immediate decisions to change a marketing message. Most compa-

nies today possess millions of bits of information on sales trends and customer feedback. If they slice and dice it appropriately, it will reveal far more specific—and accurate—information on customers. That's a far cry from yesterday's host-based systems that produced hard-copy reports on sales activity on a quarterly basis.

The current Internet activity is just the first step toward two-way communications between buyers and sellers (see related story below). With interactive marketing, companies will receive immediate customer feedback, which could then be immediately incorporated into strategies. "We'll have a whole new level of capability, a community of people interacting with you," predicts Glen L. Urban, a marketing expert and dean of the Massachusetts Institute of Technology's Sloan School of Management. "You'll give them information and they'll give you information back."

Many companies are now deciding just how big a role the Internet will play in their overall marketing strategies. Burlington Coat Factory is taking a cautious approach. Its home page on the World Wide Web features store locations and merchandise information. The page gets several thousand hits a week. "It's important to be positioned but not to overinvest or overcommit yourself," says Tammy Lowe, Burlington's assistant director of MIS.

For now, most companies are focused on shifting from the centralized, mass-marketing model to one that is

As the Web Turns

.....

Soap operas provide a model for today's new brand of marketing

Call it a midlife crisis: David Singer is separated from his wife and putting his daughter through college, but the Livingston, N.J.-based publishing executive is considering giving up his \$112,000 salary to start a mail-order book business. Understandably, he's worried about how the salary cut would affect his daughter and estranged wife. What would you do?

At The Prudential Co. of America's slick marketing campaign on the World Wide Web (<http://www.prudential.com>), your vote could influence Singer's decision and change his life. Singer is one of

seven fictional characters whose lives and financial dilemmas are winning mind-share for Prudential as people tune into its Web site to see what happens next. "All financial service sites seemed the same," says Jim Sharkey, Prudential's vice president for interactive marketing. So, in much the same way that soap operas got their start years ago, "we looked for elements, such as our ongoing story line, that might cause people to come back to our site more than once," Sharkey says.

Prudential is one of an increasing number of companies that are exploring interactive marketing possibilities on the Web as a way to entice savvy shoppers and establish a brand identity. As electronic pioneers, they have the opportunity to redefine their relationships with customers.

But the Web's rich potential also poses new obstacles as more and more companies get wired. Tom Bartolomeo, First Union Corp.'s (<http://www.firstunion.com>) vice president of marketing and strategic planning, explains, "There's

more information on the Internet than in the library of Congress, so the question becomes, how do you position yourself? How do you draw people to your site?" The answer, he says, is to make your Web site as interactive, informative and compelling as possible. "It's a different marketing strategy than that of traditional forms of marketing. Everybody has equal access to all information. You have to make sure your services are better or else people will go elsewhere," he says.

First Union developed its Web site as a new way to market credit cards, but it will eventually enable customers to conduct over the Web all transactions that they could at one of the bank's branch offices. In addition to applications for credit cards and loans and an online account-balance and bill-paying service, the site has an electronic marketplace called Community Commerce and a comment box, which received thousands of comments by the end of the first year.

"One of the first e-mails we received

quick and fine-tuned to customer needs. Using large-scale databases that contain gigabytes—and in some cases, terabytes—of information and parallel processors that provide companies with the means to calculate massive amounts of data, companies can identify their customers and their buying habits and then tailor messages to these specific groups. In theory, a company could narrow down a message to an individual person, although most one-to-one marketing efforts are targeted to several groups of customers.

Consider Burlington's marketing strategy. "The biggest thing is to identify our customers and see what segment of our business they are interested in," says Graham. "We are working to identify our 'big and tall' customers from the rest of our customers" in order to send them the appropriate promotional materials, he says. "If you aren't big and tall, why waste marketing dollars on you?"

Spalding Sports is working at one-to-one marketing by maintaining a Hewlett-Packard Co. database that profiles thousands of golf courses and pro shops throughout the country. It has incorporated U.S. Census data along with

its own sales history data. The result is a mini profile of each golf course. Spalding can determine if the golf course is frequented by primarily upscale golfers or working-class customers. It will then tailor its promotional materials for each golf course to match those customers.

**Using large-scale
databases and parallel
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tailor messages to them.**

The company has also concluded that retail store buyers are more interested in consumer issues, such as golf ball packaging, while buyers at pro shops are more interested in technical matters, such as how a golf club was constructed, says White. So it also tailors presentations and promotional materials to reflect that difference.

Not all companies should be jumping on the one-to-one bandwagon, warns Barton Goldenberg, president of Information Systems Marketing Inc. in Washington, because it doesn't fit all business models. "It could be a fatal error to overuse the one-to-one marketing concept," Goldenberg says. He suggests that while the service industry—particularly the hotel business—is perfect for individualized messages, manufacturers of many consumer products would be wasting their time to try to send a message to each customer. "You could argue that there

could be a different Pamper for every kid," he says, "[but] it's too expensive and unrealistic, and the market doesn't segment out on a one-to-one basis."

Eventually, industry consultants say the current one-to-one marketing efforts will give way to mass customization. With this approach, companies would go beyond tailoring messages to individuals and actually adapt products and services for specific individuals.

Other approaches, such as relationship marketing, call for a company to focus on building partnerships with suppliers and customers rather than focusing on products. Speed marketing, which results in a company greatly reducing the time to develop and release a product, is also expected to increase in popularity.

However a company thinks about marketing today, one thing is certain: It's going to need a plan that is fast, flexible and inexpensive. And it's going to need IT. 

Rosemary Cafasso is a freelance writer based in Walpole, Mass. She can be reached at rcafasso@aol.com.

was from a doctor in Australia who was moving to the area," says Bartolomeo. "He stumbled upon First Union's site while surfing the Web and learned that we offer relocation services, like transferring funds and setting up new accounts. So before he even moved here, he decided to become a customer."

Schieffelin and Somerset Co.'s Web page (<http://www.scotch.com>) promotes a range of six classic malts it imports from Scotland and includes recipes, a travel site and a bulletin board, where the company's representatives can interact with potential customers, plugging their products when appropriate. "People are looking to the Web for information and entertainment; our Web site delivers both," says National Brand Manager Robert Cutone. "Scotch drinkers want to know more about the history, taste and origins of Scotch. We present our whiskies in an academic way, and the World Wide Web is the perfect means to do it."

"The interactivity of the Web creates unique opportunities to develop

ongoing dialogues with consumers," says Michelle Rivero, assistant product manager for Duracell USA (<http://www.duracell.com>), whose company's Web site hooks surfers with a best toy survey, battery tips and highlights from popular Duracell TV ads. "No other broad-scale media offers the real-time, two-way communication that the Web offers. By supporting consistent two-way communication, we can engender brand loyalty in our consumer base."

Rivero suggests that another important secret to marketing successfully on the Web is to close the gap between IS and marketing departments. "Marketing on the Web has created a need for additional IS support to the marketing function in providing expertise about connectivity, hardware and software," she says. Furthermore, marketing on the Web has created an opportunity with our customers that requires our marketing managers and sales personnel to be more versed in topics historically reserved for the IS function." —Jennifer Bresnahan

According to this Harvard psychologist's theory
of multiple intelligences, it takes more than a high IQ
to be a smart manager and leader

THE BRiGHT STUFF

WHEN MICHAEL JORDAN performs an inexplicable maneuver in the air above a basketball court or Luciano Pavarotti extracts another shimmering high C from the gristle of his vocal chords, we don't necessarily think of either of these men as being intelligent. They might be, but we assume these talents to be peripheral to intelligence rather than proof of it.

Howard Gardner, a Harvard University professor of education and author, disagrees. When Jordan lifts off or Pavarotti opens wide, Gardner sees intelligence — something called bodily kinesthetic intelligence in the case of Jordan and musical intelligence in that of the big tenor. Gardner doesn't limit smarts to the traditional realms of logical reasoning and the ability



BY CHRISTOPHER KOCH

to manipulate words and numbers. He says we are all endowed with eight distinct forms of intelligence that are in part genetically determined but can be enhanced through practice and learning.

Besides the physical and musical varieties, Gardner has defined six other types of intelligences: spatial (visual), interpersonal (the ability to understand others), intrapersonal (the ability to understand oneself), naturalist (the ability to recognize fine distinctions and patterns in the natural world) and, finally—the ones we worked so hard on in school—logical and linguistic.

Though Gardner's theory (first espoused in his 1983 book, *Frames of Mind: The Theory of Multiple Intelligences*, Basic Books) is sometimes dismissed by the research community as little more than speculation, it has caught fire among ed-

ucators, especially at the grade-school level. According to Gardner, children who don't excel in the "traditional" intelligences may not get the support they need. Kids who can brilliantly divine the feelings and motives of their sandbox mates, for example, won't really have an officially sanctioned chance to shine until they take a sales job or stumble into a college psychology class.

Gardner says this tendency to focus on traditional interpretations of intelligence carries over into the workplace, where employees who are excellent team players or who are adept at spatial reasoning (visualization) still risk getting fired if they can't write a decent memo. Similarly, the "smartest" Ivy League grads risk spectacular failure if employers assume that grade-point averages necessarily translate into leadership skills. In a recent interview with Senior Writer Christopher Koch, Gardner offered ways to help bring out the specific strengths of employees and company leaders.

CIO: *Why has intelligence traditionally been limited to logical reasoning and the manipulation of words and numbers?*

GARDNER: I think it has to do with the circumstances under which the intelligence test was developed. It was developed to predict who would have trouble in school. So it's basically a scholastic kind of measure, and the more you try to apply intelligence test results to milieus like schools—which can include certain kinds of professional or business organizations—the more appropriate the IQ test is, and the more appropriate that standard definition is. But once you go outside of school-like settings, then the standard theory of intelligence is much less appropriate.

I often find that entrepreneurs think my theory is great. My interpretation is that they are people who weren't considered that smart in school because they didn't have good notation skills—you know, moving little symbols around. But they realize that often they were understanding things

that other people, including their teachers, weren't understanding.

CIO: *Traditional intelligence theories say there is a sort of reservoir of "mental energy" underlying all intellectual activities that constitutes the person's overall level of intelligence. Do you think this exists, or is it compartmentalized, as your theory seems to suggest?*

GARDNER: I believe that the brain has evolved over millions of years to be responsive to different kinds of content in the world. Language content, musical content, spatial content, numerical content, etc. And all of us have mental computers that respond

"If I know you're very good in music, I can predict with just about zero accuracy whether you're going to be good or bad in other things."



to those kinds of contents. But the strength or weakness of one computer doesn't particularly correlate with the other computer. If I know you're very good in music, I can predict with just about zero accuracy whether you're going to be good or bad in other things. So the notion of an undirected mental energy I think is not consistent with the data. It may be that some people have somewhat more efficiently running machines and perhaps, in general, they may learn or perform somewhat more rapidly than others. But being fast and not very spatial doesn't make you any better in spatial kinds of things; you probably just get the wrong answer more quickly.

It's funny that artificial intelligence is ahead of psychology in this regard. Twenty-five years ago, the notion was you could create a general problem-solver software that could solve problems in many different domains. That just turned out to be totally wrong. So they began to develop expert systems. And expert systems have a lot of knowledge built in. An expert system for diagnosing disease is very different from an expert system to analyze chemical assays. And you can't do either unless you know a lot about the particular content that you're working with. So while most psychologists still think there's such a thing as general intelligence, no software designer would proceed on that basis.

CIO: *You define the ability to interact well with other people as intelligence. Does this imply that this is an innate ability or something that is learned?*

GARDNER: I align myself with almost all researchers in assuming that anything we do is a composite of whatever genetic limitations were given to us by our parents and whatever kinds of environmental opportunities are available. You can have the best genes in the world, but if you're not exposed to music, you won't do anything in music.

Conversely, you might have a meager endowment in a certain area, but if you spend a lot of time working

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on it, and your instructors are very ingenious in helping you, you might end up performing quite well.

CIO: *What qualities constitute an "intelligent" executive?*

GARDNER: First of all, I think there's more than one kind of intelligent executive. And in terms of my theory, I think there are some executives who are tremendously good planners and have a very good understanding of the organization with which they're working as well as the domain in which the organization works and how that domain, or field, is evolving.

Other executives have more of the Ronald Reagan style. They are probably not good at planning or crunching numbers, but they're terrific at getting people to support a change in direction even if it means making some kind of a sacrifice. And ideally you get a chief executive who's strong in all of those areas as well as some I haven't mentioned.

Probably the most important thing in a company is to be aware of dimensions like this and make sure that they're represented in the leadership team and that people aren't at cross purposes with one another.

CIO: *So the issue of collaboration becomes paramount?*

GARDNER: Yeah. I think what I'm talking about really is an executive function. There are various executive functions, and if they exist in one individual it's more likely that the company will be able to work in a harmonious way than if they happen to exist in different people in different units. If they exist in different people in different units, then it becomes a major undertaking to make sure they can work well together. And that's a strong argument for having management teams with some kind of longevity because it takes time to develop good working relationships.

A lot of knowledge in any kind of an organization is what we call task knowledge. These are things that people who have been there a long time understand are important, but they may not know how to talk about

them. It's often called the culture of the organization. And if you've been in an organization for a while, you've picked up the culture; and if it doesn't take, you probably aren't going to stay with that organization. But that's not something that can be instantly acquired.

CIO: *You mention that cultures affect intelligence. For example, some tribes value musical ability as a bonding and historical mechanism. What role does a corporate culture play in improving peoples' intelligence?*

GARDNER: I think corporate culture can either stunt it or enhance it, and a lot depends on the assumptions made by the leadership about how much growth is possible in people and how much opportunity to give people to learn and to fail. I think tolerating a

"Corporate culture can either stunt intelligence or enhance it."



certain degree of failure—not because it's good for you but because it's a necessary part of growth—is a very important part of the message the leadership can give.

My theory of multiple intelligences has influenced a lot about how I think about the workplace. Fifteen or 20 years ago when I was hiring people, I often said to myself even if I wasn't aware of it, "How much is this person like me?" Either that person should be like me or I should try to make that person be like me.

And now my attitude is very much the opposite. We should be looking for people who aren't like me, who have strengths that complement mine. Especially with teams, I don't say, "Are these people all the same?" I say, "In what ways can they achieve more working together than if you simply put them together randomly or if you simply assumed that any two people would be able to handle things reasonably well?" So I think the culture that's created over time by the people who have an authorized leadership position or an unauthorized leadership role has tremendous implication for whether people actually do become more intelligent on the job.

CIO: *The IS executive has been at a kind of leadership crossroads for a while. In most companies the IS role has traditionally been a very functional, managerial-style role, and now the CIO is becoming one of the overall executive-level business chieftains.*

GARDNER: There are two types of leadership, I believe. One type is indirect leadership, where the power to influence comes not from the individual but from something he or she has done. The second type is direct leadership, whereby someone goes out publicly and tells the company and the world, "This is what we're about, this is our goal, these are the obstacles, this is how we're going to achieve it. And by the way, if you look at how I am, that's the best indication of how you should be, too."

If you're an expert, and you work with other experts, you can assume people are schooled, and you can be

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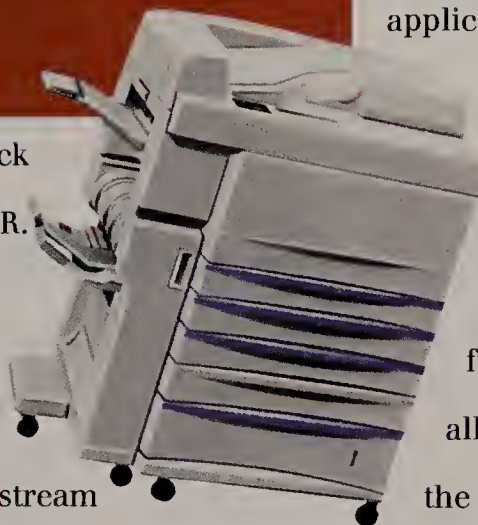
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quite technical and have a complicated story. If you're talking to the wider world, then you have to assume a mind that's unschooled, and your story has to be much simpler, much more elemental.

CIO: *Your description of direct and indirect leadership suggests that IS leaders are teetering between the two types of leadership. How can they deal with this precarious role?*

GARDNER: The most important thing is not to confuse when you're wearing one hat with when you're wearing the other. [Former British Prime Minister] Margaret Thatcher is my best example of that. She was quite sophisticated. She could sit down with ministers and talk shop, but when she went on television she never talked that way. She spoke in plain English, with common sense, and she was therefore able to be effective in both spheres.

Reagan didn't have the problem because he didn't have much of a technocratic expertise. He spoke to the unschooled mind universally. But you have leaders in America—[Former Governor of Massachusetts Michael] Dukakis was an example—who don't understand that what works well with people who are sophisticated isn't going to work well with people who don't have that kind of training. So you have to become bilingual. Not just bilingual but "bisymbolic," because the symbols you use in dealing with your colleagues—whether they're graphical, numeric or linguistic—they're the language of the discipline, of the trade, of the professional school.

The other thing is when you are working with your peers, especially in the information world, they're looking for innovation, and that doesn't frighten them at all. In fact, the kudos are for people who can come up with new ideas. That's not what works best in a more public environment where people are often afraid of something that sounds too new. People want things to change, but they don't want it to come crashing down on them.

The other thing I talk about in the

book, *Leading Minds: An Anatomy of Leadership* [Basic Books, 1995], is the relationship between reflection and public confrontation. Creators spend most of their time reflecting by themselves or with a few other people. About 10 percent of the time they go public to see whether what they're saying makes sense. I think the ratio is approximately reversed for people who are leaders.

CIO: *Does that mean that the primary intelligence that a leader should have is interpersonal, or are there others?*

GARDNER: Well, if storytelling is important, then your narrative ability, or your ability to put into words or use what someone else has put into words effectively, is important too. In fact, at the end of *Leading Minds* I

“**L**inguistic intelligences and the personal intelligences are sort of the *sine qua non* of leadership.”



talk about the linguistic intelligences and the personal intelligences as sort of the *sine qua non* of leadership. It doesn't mean that all leaders have to start with having well-developed variants of both of them, but if they're not a particularly good speaker or they don't have a particularly good understanding of other people, that's got to be a top priority for them.

CIO: *For adults and businesses, this theory seems to portend the same sorts of things that Myers-Briggs and other personality tests do: that it can be used to help staff teams with diverse types. What other implications does this have for running a department or a project?*

GARDNER: It's not just putting together a good team; it's matching a person with tasks. A trickier thing is when somebody's job changes for whatever reason. You then have to ask yourself the question, "Do the person's current skills match the job?" If not, how can we best use the intelligences they have as well as the ones that other people who work with them have to do this new job better. So you need to have what I would call a good mental model of the abilities and lack of abilities of people, and a good mental model of the job. And as the job evolves, it's kind of dynamic—you have to think about how people's abilities can be rearranged or stretched or reconfigured or combined with other people's.

I think the whole notion of "intrapersonal" intelligence is getting more and more important all the time in business. It's not just knowing yourself but having other people at work think a lot about themselves and about how they can use their abilities maximally. So often the difference between success and failure is not taking 100 courses to sharpen your skills but rather figuring out how, given your abilities, you can adjust yourself to a kind of requirement. And because historically that has been ruled as taboo—you don't want to talk about your inner feelings and thoughts and so on—I think there's a missed opportunity for people to mobilize themselves. **CIO**

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A Mappable Feast

Geographic information systems, once the tool of governments, geologists and cartographers, have found a home in the business community. And managers will never look at maps the same way again.

BY DENNIS HAMILTON

Census statistics. Purchasing habit information. Income breakdowns. If this kind of raw data is like food, then geographic information systems (GISs) are the gourmet-supreme processors that mix and mash that "food" into an easy-to-digest meal of marketing information. That ability should be enough to make CIOs' mouths water, given the challenge they face in delivering increasingly vast amounts of information to their companies in ways that are useful and easy to access. When prepared properly, that data can fuel marketing efforts to push new products in some regions, withdraw products from others and discover new customers in still others. This potential may also explain why recently affordable GISs are soaring in popularity.

"I can put 80-page spreadsheets with thousands of rows into a single map," explains Janet M. Hamilton, market research administrator for Dow

Elanco, a \$2 billion maker of agricultural chemicals based in Indianapolis. "It would take a couple of weeks to comprehend all of the information from the spreadsheet, but in a map, the story can be told in seconds."

The function of a GIS is as simple as its execution is complex; data from spreadsheets and databases is precisely tagged (the industry term is "geocoded") so that it can be portrayed in graphical map form. The power of this geographic information is in its ability to store, integrate, model, analyze and depict many kinds of data. Managers can see virtually any condition as a parameter in a given geographic area, from neighborhoods to worldwide regions, using colors and patterns to identify and distinguish attributes such as ethnicity, soil type, income, rainfall, environmental quality and frequency of accidents.

GISs began life in the mid-1960s as mainframe-based tools to track environmental or population changes across large geographic areas over time for such government agencies as the U.S. Census Bureau. Then, more than a decade ago, large businesses saw the advantage of putting detailed marketplace information into easily comprehensible geographic, or spatial, maps.

Until recently, the technology wasn't widely available nor, at least for most businesses, affordable. That is changing dramatically. A revolutionary surge in sales came in the last three years as the latest in desktop computer technology paved the way for GIS applications into any business that must merge voluminous data with geography.

In the last five years, GIS revenues have more than doubled, rising to more than \$500 million, according to *Geographic Technology Markets* (GTM), a bimonthly market



research report published by GIS World Inc. in Fort Collins, Colo. And it will double again by 1998, to \$1 billion, says GTM, thanks to a growing array of customers, more diverse applications and price slashing caused by industry competition. Some full-blown GISs still cost more than \$100,000, but the desktop GIS wave has pushed prices to much less than \$1,500. In addition, products such as Microsoft Corp.'s Excel now are being delivered with mapping capabilities (in this case, with an extension called Data Map, from MapInfo Corp. in Troy, N.Y.) that easily incorporate spreadsheet and database information into colorful, detailed information-packed maps.

After spending almost three decades as a pricey, well-kept secret, the GIS marketplace has developed enormous sophistication. Unlike most newly considered technologies, GIS already has a wealth of research data, an increasingly competitive cadre of suppliers, sound support groups and practices, and an evolved variety of aftermarket providers selling everything mappable—from demographic information to ZIP codes.

MapInfo plans seven CD-ROMs with vertical market data for \$99 each, a price inconceivable a few years ago. Winnetka, Ill.-based Wessex Inc. is now shipping a product that contains maps and data down to the neighborhood level for the entire United States. Called FirstMap, the CD-ROM sells for \$69.

What that means for businesses is that, in addition to the map-making software that has come to the desktop, much of the other groundwork that made mapping prohibitively expensive and exasperatingly tedious has already been done. It doesn't mean, however, that the technology is intuitively simple or that the maps are painless to produce—yet.

"The spreadsheets I create might contain agricultural and other information on every county in the United States," says DowElanco's Hamilton, who uses Atlas GIS for Windows from Strategic Mapping

Inc. "I have an absolute need for precision and correctness. If I do it right, I see a map that details exactly which products should be marketed

After spending almost three decades as a pricey, well-kept secret, the GIS marketplace has developed enormous sophistication.

in any given county, based upon soil, rainfall, crops and historical yield. If I do it wrong, I could end up with a marketing campaign pushing the wrong products. GIS is highly dependent on good information."

With that information, CIOs are finding GISs to be a significant tactical tool for identifying product niches by geography, facilitating presentations, improving comprehension, identifying logistical problems and developing marketing strategies. Some examples:

- Health maintenance organizations (HMOs) and medical clinics use mapping to determine optimum clinic locations by examining accident and injury frequencies in specific neighborhoods;
- Wood Personnel Services Inc., a Nashville-based employment agency, boosted placements by 25 percent in one year by mapping neighborhoods where temporary workers lived, then locating marketing and recruiting sites there;
- Wilkening & Co., a Park Ridge, Ill., consulting firm, uses Wessex's First St. GIS to design optimized sales territories and routes for clients, slashing their travel costs by an average of 15 percent;
- CellularOne, a San Francisco cellular network provider, uses MapInfo from MapInfo Corp. to map its entire cellular network, helping it identify clusters of call disconnects and dispatch field-service technicians for troubleshooting.

The advent of desktop applications is expanding the number of GIS uses exponentially, and users now range from mom-and-pop shops to governments in Europe. In a discussion document called GI 2000 (<http://www2.echo.lu>) the European commission, among others, has proposed European Geographic Information Infrastructure (EGII), a road map of standards, regulations and practices that will govern GISs in Europe. The goal: sprawling government information maps for property and highway maintenance, command and control systems for emergency dispatch and defense, catastrophe management, environmental protection and management, exploration of natural resources, agricultural planning, and analysis of disease and health issues by geography.

Clearly, GIS technology—and its impact—have demonstrated the potential to become globally pervasive. Interestingly, part of the European conference is to be devoted to potential abuse from the acquisition and use of geographic information, including the Big Brother-like intrusion of privacy as more, personal information is captured and encoded.

Whatever concerns exist about GIS usage, the rapidly evolving technology is gathering undeniable momentum. One reason is the comparatively low cost of today's GISs. The desktop applications themselves can sell for as little as \$400 (Newton, Mass.-based Caliper Corp. sells Maptitude for \$395). The CD-ROM-based data sets can range from \$50 to many thousands, but even the high-end prices don't yet seem to be prohibitive.

Vendors are now structuring product lines that treat the software and hardware separately from the data sets needed to make the maps. Wessex's First St. bundles the software and 17 CDs of GIS information—including data compiled by federal, state and local agencies, plus the household-by-household tally of the U.S. Census Bureau—for \$2,495.

The CD-ROM data sets are what make GISs worthwhile for Brenda Pace, communications consultant at

Acordia Senior Benefits (ASB), a subsidiary of Acordia Inc., one of the 10 largest insurance companies in the United States. "We use the GIS [Informark from Equifax Marketing Decision Systems Inc. and ArcView from Environmental Systems Research Institute Inc.] primarily to map out locations for new insurance products," she says. "We have found whole marketing areas just from the information from the mapping. And we have decided we didn't want to get into an area after we saw the image."

The Census Bureau data alone contains enough household information to define an insurance marketing plan in a given neighborhood, says Pace. Add in data that uses trending to project that same neighborhood five years out, and mapping goes from a tactical tool to a strategic one.

At a price of more than \$10,000, the CD-ROM data sets used by ASB are pricier than some of the of the economical packages being sold now, but Pace says the cost is more than worth it. "We can determine whether we have full-market coverage instantly," she says. Simply by merging household data with sales and policy-type information, management can look at a map and figure out where to open an office, which policies to market there, even to which addresses to market them.

For CIOs contemplating the addition of a GIS, the most important tip is to take time for a judicious look at this busy marketplace. While desktop GIS applications have pushed prices down, a bargain-priced generic GIS is not a deal if it doesn't suit your needs. "Setting up a system is not a trivial thing," explains Jack I. Mostert, a systems analyst at the Canadian subsidiary of Chicago-based Amoco Corp. working with a group setting up a GIS to aid in oil exploration and analyze the company's complex environmental management issues. What he found was a daunting and risky task. "You could spend years putting a system together and not have it solve one problem for you," he says.

While Amoco's mapping needs exceed those of most businesses,

the task of producing high-quality, strategically useful maps isn't a piece of cake for anyone. Even with tremendous strides being made in easy-to-use software, the job of geo-

For CIOs contemplating GIS, the most important tip is to take time for a judicious look. While desktop GIS applications have pushed prices down, a bargain-priced generic GIS is not a deal if it doesn't suit your needs.

graphic information map making has to be delegated to specialists for all but the simplest maps. For the most part, the problem is information. "If garbage in, garbage out applies anywhere, it's in GIS," laments Mike Sisk, a software engineer in the GIS market group of Autodesk Inc., a world leader in computer-aided design that recently purchased Automated Methods, a South African GIS company, to beef up its GIS product line. Sisk worries that budget-slashing debates in Washington will have an impact on root information upon which GIS users have come to rely. "Cutbacks in government agencies such as the Census Bureau and Geological Survey will affect what data will be available. Perhaps private industry will take over these functions, but cost and accuracy will suffer."

The generation of serious maps remains essentially a time-consuming and tedious process, not withstanding the advances in simplicity made during the desktop GIS revolution. That hasn't stopped CIOs and other managers from asking the GIS administrator for a map for that afternoon's meeting. As a company develops its mapping pro-

cesses and technologies, scripting tools can be used to create mapping applications unique to that company, thus speeding up the mapping process. And some companies are investing in data-acquisition integrity products such as All Points Software Inc.'s FieldPack Mobile Professional (FMP) software, a portable tool based on MapInfo that helps automate field data collection, storage and retrieval.

But these advances won't replace a meticulous information administrator. The information imperatives in GIS maps are imposing. Data is attached to precisely placed geocode points. When root information gathering is shoddy, even the most vibrant map is rendered useless. Thus, the most important commitment a CIO can make in GIS is to strive for a flawless information acquisition and administration process.

The mounting popularity of GISs means they will experience more technical advances in the next few years than they had in their first 30. Increasingly dazzling graphics, including 3-D and animation, will make the maps more vital, and even entertaining, in communicating information and drafting corporate strategies. Standards compliance will enable geographic information to be extracted from the Internet's World Wide Web. Object linking and embedding (OLE) will allow users to import maps into any document. And mega-databases will enable the creation of huge map objects: From an aerial view of the United States, a user could click on a state, a city, a neighborhood, a street, an address, with macro to micro data available each stop along the way.

Eat up. **CIO**

Dennis Hamilton is the president of Software Analytics Inc. in Indianapolis and has been writing about computers, software and business for 21 years, publishing more than 900 articles. His next book is The 60 Minute Guide To Netscape Navigator Gold 2.0, which will be published in April by IDG. He can be reached at cato@iquest.net.



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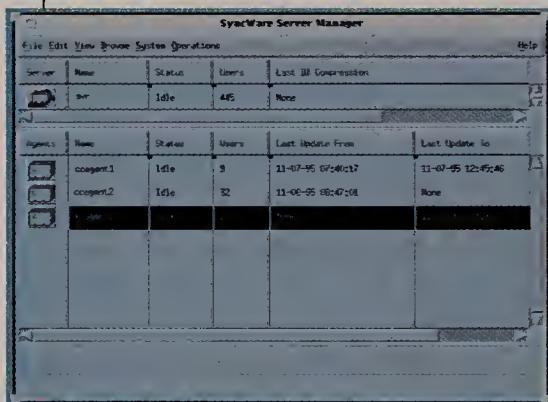
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Network administrators who work long hours trying to keep dissimilar e-mail system directories updated—and users who worry that their e-mail messages will get lost or returned to them because they used the wrong system—can rest easy thanks to Hitachi Computer Products America Inc.'s multiplatform software solution for enterprise e-mail directory synchronization. The newest addition to the company's SyncWare product line is The Universal Agent, which automatically synchronizes and updates the directories of any e-mail system with those of any other e-mail application. These systems include LAN-based sys-



tems such as Microsoft Mail, Lotus Notes and Novell's GroupWise; legacy systems such as Digital Equipment's All-in-1, Hewlett-Packard's OpenMail and Banyan Systems's StreetTalk; host-based systems such as Verimotion's Memo; and any other directory or database that can import and export ASCII files.

The Universal Agent is installed on each e-mail system where, at a predetermined time, it sends address changes to the SyncWare Server to update each e-mail system's directory with the most current user information. The Universal Agent is priced at \$2,995; servers begin at \$4,995. SyncWare Servers are available for Sun Microsystems Inc.'s SunOS and Solaris or HP-UX. For more information, call 408 986-9770.

Process Perfection

Order processing and product fulfillment can represent 10 to 15 percent of a product's sales; effective supply-chain management can cut these costs by as much as 30 percent. Yet of the 300 companies surveyed recently by KPMG Peat Marwick, only 35 percent have formal processes in place for managing their supply chains. Billions of dollars in untapped revenues lie buried in inefficient supply chains—tangled up in excess inventories, unused manufacturing capacity, poor delivery performance and missed business opportunities. But companies can improve supply-chain responsiveness and efficiency with Dallas-based I2 Technologies' Truly Integrated Planning System (TIPS), a decision-support and execution software that plans all pieces of the supply chain concurrently.

Historically, planning has been conducted sequentially, with separate plans generated for materials requirements, manufacturing resources planning (MRP), distribution requirements planning (DRP) and other segments of the supply chain. TIPS allows for concurrent planning of all segments in real time while taking all constraints—such as material shortages, equipment bottlenecks or management policies—into consideration. Suppliers, manufacturers, distributors, transportation companies and customers are all synchronized to reduce supply-chain management costs.

TIPS, which employs advanced artificial intelligence as well as object-oriented and GUI technologies, is designed to operate on all standard platforms. It is fully compatible with existing MRP and DRP transactional systems as well as standard business databases and legacy information systems—including but not limited to those developed by Oracle Corp., SAP America Inc., Avalon Software Inc. and Datalogix International Inc. TIPS is available in the United States, Canada and Japan. For more information, call 214 620-0026.

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When IS departments implement client/server applications, it becomes difficult to build and maintain the bridge between the system and the applications and data that reside on the desktop. To address this dilemma, Oberon Software Inc. developed Prospero, a Windows-based, fully programmable and expandable point-and-click visual software tool that integrates data among desktop applications, databases and Lotus Notes. Prospero users can quickly move data back and forth among Notes, Microsoft Corp.'s Microsoft Excel and Microsoft Word or corporate SQL databases without coding, difficult export and import processes, and cumbersome cut-and-paste commands.

Prospero uses a direct manipulation interface to construct a box-and-arrow diagram, which builds an application from reusable components. Using Object Linking and Embedding technology to integrate a

wide range of applications and Open Database Connectivity to integrate relational databases, Prospero creates graphical building blocks from various applications. Users connect building blocks with arrows that indicate how the data should flow through the program. Ports on each building block correspond to locations that Prospero finds within application files, such as spreadsheet ranges, document bookmarks, SQL database columns and Notes form fields. Prospero finds these locations automatically when it creates the building block. When a user runs the program, Prospero will read and write data to and from the applications and perform any other logic or computation included in the visual program.

Prospero is available at an introductory retail price of \$695 and runs on any PC supporting Windows 95, Windows NT or Windows 3.1. For more information, call Oberon Software at 617 494-0990.



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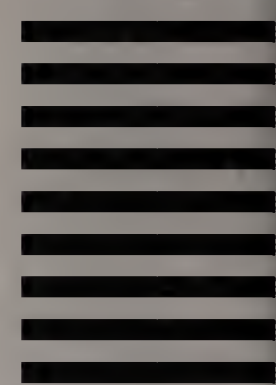
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did we mention they have a chart?

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Grapes of Wrath

The inefficiencies of fax-based inventory management were keeping the Kendall-Jackson winemakers from their grapes—until frame relay and a client/server system liberated them

Knowing what's in inventory and where it's located is critical for any manufacturer. Incomplete records cost money and time and hinder market agility. When the inventory is the grapes and fermented juices for making wine, ineffective management can affect quality, too. For Kendall-Jackson Vineyards & Winery Ltd., the twelfth-largest wine producer in the United States, inventory is a palette of flavor, color and aroma from which winemakers draw to create their art. But the company's 35 percent annual growth rate and expansion to 12 sites was pulling apart the artist's palette.

"The business was being run by fax," says Gerry Allen, director of information systems at the Santa Rosa, Calif.-based company. Each facility kept inventory and production records on a seven-year-old DOS-based program accessible via its own local area network, but the LANs weren't interconnected (except to an IBM AS/400 at headquarters that pumped out basic financial data to the various facilities via leased lines). Assessing overall inventory meant polling each location by fax and aggregating the data in a spreadsheet, a process that took two to three days, according to Charles Thomas, director of production.

But the company's biggest concern was that winemakers were

spending more time crunching faxes than crushing grapes. A critical part of making wine is trial blending, combining different wines with different attributes to find just the right blend with which to endow the final product. In the quest for blend candidates, a winemaker might end up with as many as 300 pages of faxed data. The company also needed a more accurate picture of its inventory so that it would know immediately whether to supplement its production with grapes from the spot market.

Kendall-Jackson sought a Windows-based inventory and production management application to aggregate, organize and catalog inventory data input at various individual sites. It would enable winemakers to share data across a wide area network and generate customized reports. Finding no such industry-specific program, Allen's four-person IS staff started developing their own in February 1995. The client/server application, just now coming out of pilot, was written in Microsoft Corp.'s Visual Basic and IBM's Report Program Generator (RPG) IV over eight months and runs on the company's AS/400 and distributed PC clients.

To achieve an enterprisewide view of inventory from grape to bottle, the company deployed a WAN based on frame relay technology. Frame relay could accommodate the winery's AS/400 Systems Network

Architecture (SNA) and LAN Internet Packet Exchange (IPX) traffic more cost-effectively than could an expensive cluster of leased lines. The WAN setup cost approximately \$120,000, and the winemaker saved \$1,600 a month as it retired its leased lines and moved existing AS/400 traffic to the new network.

Kendall-Jackson outsourced the network management chores to NetSolve Inc. in Austin, Texas. Outsourcing not only fit with Kendall-Jackson's corporate culture of focusing on its core business but also saved the company roughly \$50,000 a year, according to Allen.

Although it's too early to quantify the benefits of the Windows application, Allen has no doubt it gives Kendall-Jackson a competitive advantage. Now buyers can accurately and quickly forecast how much inventory they must purchase and what price they need to pay to ensure acceptable gross margins. The system also frees the winemakers from the tyranny of the fax machine, leaving them more time to practice the subtler techniques of the art of making wine.

—Tam Harbert

Harbert is a freelance writer specializing in high-technology. Based in Andover, Mass., she can be reached at 70733.3557@compuserve.com.

VITAL STATISTICS

Organization: Kendall-Jackson Winery Ltd., Santa Rosa, Calif.

Application: Client/server inventory and production management

Technologies: Software written in Microsoft's Visual Basic and IBM's Report Program Generator (RPG) IV; AS/400 server, 11 Ethernet and one token ring LAN; Gateway 2000 P5-100 clients and frame relay WAN

Scope: 70 users companywide

Sponsors: Tom Selfridge, senior vice president of production and marketing; Gerry Allen, director of information systems

Objective: To leverage the individual winemaker's time and allow the company to more efficiently track inventory

Payoff: Improved product quality and provided a more timely inventory assessment

come on out and work.
(it's nice out here)



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